

MINISTRY OF TRANSPORT
AND CIVIL AVIATION

Road Safety

THE SLOUGH
EXPERIMENT

*Report on a large-scale experiment
into the effectiveness of road safety measures
conducted in the Borough of Slough
from 2nd April, 1955, to 31st March, 1957*

LONDON

HER MAJESTY'S STATIONERY OFFICE

1957

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Acknowledgement is made for permission to reproduce photographs to: Slough Borough Council for Plates 1, 2, 10, 11, 13 and 15; "Slough Observer" for Plates 3, 7 and 12; Bernsen's International Press Service Ltd. for Plates 5 and 9; Raleigh Industries Ltd. for Plate 4; Sport and General Press Agency Ltd. for Plate 8.

THE SLOUGH EXPERIMENT

2nd April, 1955, to 31st March, 1957

COMPOSITION OF THE MANAGEMENT GROUP

Ministry of Transport and Civil Aviation

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D. C. Haselgrove, Esq. (Chairman, from 2nd January, 1956)
C. E. Hollinghurst, Esq., M.Eng., A.M.I.C.E. (*Divisional Road Engineer*)
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P. A. Robinson, Esq. (until 12th August, 1955)

Slough Borough Council

Alderman R. C. Abbott
Alderman F. Warwick (until 31st May, 1955)
Councillor N. M. Eschle (from 1st June, 1955, to 27th May, 1956)
Councillor P. Morris (from 28th May, 1956)
N. T. Berry, Esq. (*Town Clerk*)
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Central Office of Information (Social Survey Unit)

H. D. Willcock, Esq.

Buckinghamshire Police

Brigadier J. N. Cheney, O.B.E., D.L. (*Chief Constable*)
Chief Superintendent B. Lord (until 6th January, 1957)
Chief Superintendent E. Watson (from 7th January, 1957)

Royal Society for the Prevention of Accidents

Major-General B. K. Young, C.B.E., M.C.
R. F. E. Howard-Hodges, Esq., M.B.E.

Secretary: A. Fleming, Esq. (*Ministry of Transport and Civil Aviation*)

REPORT

*To the Rt. Hon. Harold Watkinson, M.P.,
Minister of Transport and Civil Aviation*

To meet the request of your predecessor, the Rt. Hon. John Boyd-Carpenter, M.P., that a large-scale experiment should be undertaken into the effectiveness of various road safety measures, the Borough of Slough was chosen as the site for the experiment, and a Management Group to be responsible for its planning and direction was set up on 2nd December, 1954.

The "Slough Experiment" began on 2nd April, 1955, and the experimental period of two years ended on 31st March, 1957. This is being followed by a period of continuing study of the effects of the various measures introduced, which may extend over several years. The full results cannot, therefore, yet be given, but the Management Group felt that as soon as possible after the end of the experimental period they should submit a report on the measures undertaken. They accordingly present this report, which includes interim assessments of the results provided with the co-operation of the Road Research Laboratory of the Department of Scientific and Industrial Research and the Social Survey Unit of the Central Office of Information, and their own comments and recommendations so far as they are able to advance them at this stage. Part I of the Report details the measures undertaken and Part II discusses their results. Part III, which may conveniently be read as a summary, contains the comments and recommendations of the Management Group.

The Management Group would like to place on record their view that the Slough Experiment has proved a most worthwhile venture, and they feel privileged to have been concerned with it. They would also like to express here their appreciation of the services rendered by their Secretary, Mr. A. Fleming of the Ministry of Transport and Civil Aviation, and by those others, not members of the Management Group, who served on the various Sub-Groups or otherwise gave invaluable help.

D. C. HASELGROVE

Chairman, Management Group

August, 1957

INTRODUCTION

Purpose of the Experiment

In 1954 the Minister of Transport and Civil Aviation decided that a large-scale Experiment should be carried out over a period of two years, in an attempt to determine the effectiveness of various new and existing measures for improving road safety.

The individual measures were not all to be experimental in the sense that each would involve new basic principles; the unique feature would be the concentration of all these measures in a comparatively small area.

Measures were proposed under heads corresponding broadly with those of Education, Enforcement and Engineering, or the "Three E's" as they are generally known. Studies were to be made of the effect of the measures introduced both collectively and, so far as possible, individually on the conduct of road users, on the accident rate and on the flow of traffic, so as to provide information for use in determining future policy on road accident prevention.

Selection of Slough as the site for the Experiment

It was decided to select an area for the Experiment which was compact and where careful observation and measurement of the results could conveniently be made and where road conditions were fairly characteristic; it was desirable that the area should include residential and industrial areas, with both local and through traffic, and with typical accident problems; also it was necessary that the area should have an active road safety organization. With these factors in mind Slough was selected. The Traffic and Safety Division of the Road Research Laboratory is at Langley within the Borough boundary, and the Slough Borough Council and the Buckinghamshire Police offered their full co-operation.

It was recognized that difficulties would arise in attempting to reach definite conclusions as to the effects of experimental measures in Slough, where the numbers of road accidents would be, for statistical purposes, relatively small. This limitation was accepted, however, because of the suitability of Slough in other respects as the site for the Experiment.

The Borough of Slough is situated approximately 20 miles from the centre of London, and is approximately 6 miles long by up to 2 miles wide, the London-Bristol Trunk Road (A.4) running through it roughly from east to west along its length. (See key plan inside back cover.) In 1954, the population, which is steadily increasing, was approximately 67 000; in 1957 it is estimated at nearly 70 000.

Industry is mainly concentrated on the Slough Trading Estate, lying on the northern side of A.4 west of the town centre; it is estimated that about 37 per cent of the workers on the Trading Estate come from outside the Borough of Slough, which has a total working population of approximately 54 000. The main shopping area, lying on A.4, serves a considerable surrounding area and has typical 'High Street' traffic problems—congested pavements, parked vehicles, and heavy traffic at peak periods. There are proposals to construct a by-pass for Slough, but at present, in the absence of a suitable alternative route, Slough High Street, and the rest of A.4 in the Borough, carries a high proportion of through

traffic. Pedal cycle traffic in the Borough is abnormally heavy, particularly in the mornings and evenings.

Organization

It was decided that the Slough Experiment should be undertaken as a joint operation by the Slough Borough Council, the Slough Road Safety Council, the Ministry of Transport and Civil Aviation, the Road Research Laboratory, the Social Survey Unit of the Central Office of Information, the Buckinghamshire Police and the Royal Society for the Prevention of Accidents. To this end a Management Group was set up, on which these authorities and bodies were represented, to be responsible for the overall planning and conduct of the Experiment.

Under the Management Group were established four Sub-Groups with representatives as appropriate from the bodies listed above, to be responsible for detailed planning and day-to-day arrangements concerning:

- (a) Propaganda and training
- (b) Police activity
- (c) Engineering and traffic schemes
- (d) Study of results.

The organization proved entirely satisfactory, and provided what is perhaps a unique example of close and cordial co-operation between central and local authorities, this being fostered by the identity of purpose of the authorities concerned in seeking methods to prevent loss of life and injury on the roads.

Finance

Engineering and traffic schemes and road safety propaganda and training as described in Part I of this Report were financed under normal arrangements. In all the total cost of the measures undertaken in connection with the Experiment up to 31st March, 1957, is estimated at:

Engineering and traffic schemes: £124 900.

Education—Propaganda and training: £8 200.

The additional police effort involved was met by temporary diversions of manpower and resources from other work.

The above figures take no account of the contribution in terms of administrative effort made by the participating authorities and by the other organizations and persons who helped in the arrangements, nor of the cost of observing the results.

Measurement

It was necessary to obtain a picture of conditions in Slough before the Experiment began, for comparison with conditions during and after the experimental period. Detailed studies were therefore made by the Road Research Laboratory and the Social Survey Unit of the speed and character of traffic, road behaviour and public opinion. In case knowledge of the proposed Experiment should affect people's behaviour and opinions, and thereby bias the results of these studies, news of the Experiment was not made public until this work was completed. On 31st March, 1955, details were announced by the Minister of Transport and Civil Aviation in the House of Commons.

The Experiment lasted from 2nd April, 1955, to 31st March, 1957.

General and detailed studies into the effects of the Experiment were made throughout this period and will continue for some considerable time. It is

expected that the final analysis will provide further valuable information; the results so far as they can be assessed at present and discussion of them are given in Parts II and III.

Phasing

The various measures did not all begin simultaneously but were phased so as to provide the best opportunity of determining the effects of each separately. Road safety propaganda and training and police activity began at the outset. Engineering and traffic schemes which, apart from the need for phasing their introduction, required a considerable amount of preparatory work on planning and design, began to come into effect at a later stage.

A diary of the main events during the Experiment is given in Appendix 1.

PART I

Description of Measures Undertaken

EDUCATION—PROPAGANDA AND TRAINING

POSTERS

One of the first aims was to tell the public in Slough about the Experiment and to secure their co-operation. A special poster bearing the message "Make Slough the Safety Town" was used extensively at the outset on 120 poster sites throughout the Borough and on 206 sites on buses.

Only as regards the scale on which they were used was there any 'experimental' aspect in these and later posters. Simple, bold designs were a feature of the posters, and use was made of fluorescent inks to make the posters as attractive as possible. A special symbol of a cautionary upraised hand was used throughout on posters and propaganda material to assist their identification with the Experiment (see Plate 1).

Later posters formed the basis of a series of special campaigns to encourage better road behaviour, each of approximately three months' duration and on themes generally related to the rules of the Highway Code. In addition to these quarterly campaigns, several special campaigns were conducted, for example those arranged with police support to secure the better control of dogs and the greater use by motor cyclists of safety helmets. Posters were also used to publicize such items as the vehicle tests, training courses and engineering and traffic schemes, as described later.

In all it is estimated that 10 000 posters, the majority of double-crown size, were used in the two-year period.

OTHER PROPAGANDA

An illustrated and attractive brochure was prepared at the start of the Experiment and distributed free to each of the 20 000 households in the Borough; this gave an outline of the proposed experiments and showed how the public could help. A free copy of the Highway Code was issued at the same time.

Simultaneously more than 1000 letters were sent to factories and organizations asking them to display road safety material during the Experiment. Drip mats, shop window stickers, correspondence stickers, bookmarks and other material were freely distributed, and propaganda was exhibited in display cases in different parts of the Borough.

Similar supporting material was used in the quarterly campaigns, together with calendars, shop counter display cards, Public Library date-stamp sheets, printed adhesive tape, publicity inserted in bus timetables, records and slides in cinemas, roadside warning notices for drivers, and leaflets distributed in some cases by local newsagents. A monthly news-sheet showing the accident statistics for the previous month was issued to factories and business houses.

A beacon was erected in the busy shopping area to shine red for one week after a fatal accident and green at other times (see Plate 2). This was sited on a centre island at "The Crown" crossroads (12 on key plan) at a height of 25 ft to make it readily visible to pedestrians while keeping any risk of distraction to

drivers and cyclists to a minimum. Notices on nearby guard rails explained the significance of the beacon.

Roadside notices were erected at the Borough boundary and elsewhere in the Borough to tell or remind visiting drivers that they were in the area of the Experiment.

A 'Safety Town' song was composed and played in cinemas; 15 000 copies of the sheet music were distributed through schools.

Mail issuing from Slough Town Hall bore a road safety slogan in the postmark.

Contact with the public was facilitated by the regular reporting and discussion of the Experiment in the two local papers, a press conference being held weekly.

A campaign was conducted during August and September, 1955, to encourage pedestrians to keep to the left on pavements and crossings in the High Street, and printed metal plates bearing appropriate instructions were erected on lamp standards and at crossings. Footprints were marked on the pavements as a publicity feature, and a competition related to the campaign was conducted through Saturday cinema clubs for children. The campaign could not be continued for a longer period owing to road works and achieved only limited success (see page 42).

From September to November, 1956, Slough participated in the national "Mind that Child" campaign.

A special campaign was also arranged from September to December, 1956, to encourage the fitting and maintenance of efficient vehicle stop lights. It was conducted with the assistance of proprietors of garages and service stations, who displayed posters inviting customers to have their stop lights tested free of charge.

Road safety displays were arranged at the annual summer carnivals in 1955 and 1956, and these aroused much public interest.

A second illustrated brochure, in the form of an interim report to residents, was distributed to households at the end of the first year of the Experiment.

A further brochure was distributed in June, 1957, covering some of the results, and the door-to-door distribution of some 21 500 copies was undertaken by the Junior Road Safety Committee (see page 7.)

As described later, the police supported the road safety campaign and directed particular attention to educating road users in safer behaviour.

The effects of the propaganda measures undertaken during the Experiment are considered on pages 36 to 45 in Part II.

ROAD SAFETY TRAINING

(a) *Adults*

In general, basic training courses for adult road users were not undertaken as a part of the Experiment and the main emphasis was on schemes to develop existing skills. An exception to this was, however, the expansion of the learner motor cyclists' training scheme in Slough; this scheme is sponsored nationally by the Royal Automobile Club and the Auto-Cycle Union and organised in Slough by the Farnham Royal Motor Cycle Club and the Road Safety Council. The standard training course usually takes 12 weeks; without reducing the actual amount of instruction, its length was reduced to 9 weeks, and by this means the voluntary instructors were able successfully to train 80 pupils during the period of the Experiment.

Road safety rallies were arranged for motor cyclists, motorists and commercial vehicle drivers to encourage the development of driving skill and promote safer road behaviour and they proved popular. Entries were, of course, on a voluntary basis. In all, five rallies were held, the two for commercial vehicle drivers serving as eliminating rounds in the annual national "Lorry Driver of the Year" contest.

'Refresher' courses of lectures were introduced for drivers (see Plate 3). A maximum of 20 drivers attended each course, which consisted of three 1½-hour sessions given over a period of three weeks. The response by drivers to this facility was very encouraging.

It is not, of course, possible to assess the effects of these activities, except as regards the attitude of the public to them and their response (see page 38 of Part II).

(b) *Children*

The amount of general road safety education given by teachers and by the police in schools in Slough, as elsewhere, is at the discretion of head teachers, and the extent of such education during the Experiment therefore varied from school to school. Prominence was, however, given to road safety in most of the schools and there is no doubt that the total effort in Slough in this direction was considerable. Schools with an accident-free record were presented at the end of each year with a 'Certificate of Merit' by the Mayor, and these are greatly prized.

Side by side with these arrangements were the efforts made by the Road Safety Council to develop substantially the local voluntary Safe Cycling Proficiency Scheme for children aged nine years and over, run on the lines of the scheme sponsored nationally by the Royal Society for the Prevention of Accidents. The facilities for training and testing child cyclists under the scheme were extended, and considerable publicity was given to them. During the two-year period 950 children were trained in Slough to the standard required to qualify them for a cycling 'licence' and a proficiency pennant to attach to their cycles. On passing the proficiency test, children are eligible to become members of the Juvenile Cyclists Club. To supplement the Safe Cycling Proficiency Scheme, two competitions for members of the Club were held annually with the object of encouraging and maintaining safe cycling habits.

In addition, a school of cycling was run as a special event in April, 1956, by Raleigh Industries Ltd., in co-operation with the Slough Road Safety Council (see Plate 4). The 240 children enrolled, many of whom had not previously ridden a cycle, were each given 10 hours' basic training. A comprehensive proficiency test, to the standard of that normally given in the Safe Cycling Proficiency Scheme, was held at the end of the course for all over 9 years of age, and 165 children qualified. Those who did not qualify were invited to enrol for further training under the normal scheme.

A further contribution to road safety training for children was made by the setting up of a Junior Road Safety Committee, comprising two elected representatives from each of the senior schools; these representatives have in several instances formed Road Safety Committees in their own schools. The Junior Committee helped in the arrangements for an inter-school road safety quiz in 1956, which aroused keen interest and is to be repeated annually.

A special measure undertaken in 1956 by the Road Safety Council with the help of the Road Research Laboratory was the working out of safe 'Routes to school' for the 500 children between the ages of 7 and 11 attending the Lea

County Junior School. The main entrance to the school is in Wexham Road (15 on key plan), which carries relatively heavy traffic; a School Crossing Patrol operates at this point at school assembly and dispersal times. Each child marked on a blank street map the route normally followed. The completed maps and local conditions were studied and, where necessary, safer routes were suggested, in particular to ensure that maximum use was made of the School Crossing Patrol. The new routes were marked on a second map (see Fig. 1) and parents

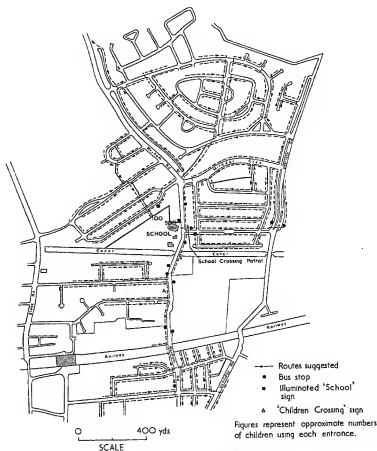


Fig. 1 "Routes to school" experiment

were asked to ensure that their children followed them. In connection with this measure 'School' signs to a new design (since prescribed by the Ministry of Transport and Civil Aviation for general use) and specially illuminated by neon tubes at starting and finishing times, were erected in April, 1956, on approach roads near the school (see Plate 5). 'Children Crossing' signs were also erected at points where children would converge to cross the roads.

A proposal for the experimental use of scholar patrols in Slough was abandoned because the co-operation of all the parties who would be concerned could not be obtained.

The number of school children in Slough increased considerably during the period of the Experiment (see page 29). Casualties to child pedestrians and cyclists are examined on pages 32 and 33, and the results of the 'Routes to school' experiment on page 42.

VEHICLE TESTING SCHEMES

Free tests of the roadworthiness of motor vehicles were arranged to provide information about general standards of vehicle maintenance and to see what demand there would be for such facilities.

The Slough Vehicle Testing Station, which was in operation for a period of four weeks during June and July, 1955, was the first of its kind in the country and provided free tests of the condition of brakes, lighting, steering, tyres and accessories affecting safety (see Plate 6). It was organized by the Road Safety Council with the assistance of vehicle component and accessory manufacturers, the motoring organizations and local motor agents.

Extensive publicity was arranged and there was a continuous flow of vehicles for testing. Over 1800 were tested and about half were local vehicles.

A description of the tests follows:

Brakes. The braking force at each wheel was measured with a roller-type brake testing machine. In addition, the maximum deceleration achieved during braking from about 20 m.p.h. was measured with a maximum deceleration (or 'Tapley') meter.

Tyres. The state of tread patterns and tyre walls and evidence of wheel misalignment were noted.

Steering. The condition of front wheel bearings, kingpins, etc., was examined and the alignment of the front wheels was measured.

Headlights. The vertical aim of the open-road beam of each headlamp was measured with a beam-setter and the condition of the lamp reflectors, the dipping mechanism and focusing of the bulbs was checked.

General. The condition of items of vehicle equipment was examined. These included horn, windows, windscreen wipers, mirrors, direction indicators, side lights, rear lights and reflectors, stop lights, door handles and locks.

Further tests were arranged by the Road Safety Council on three Sundays during June and July, 1956, primarily with the object of attracting 'week-end' drivers. The tests were rather simpler and quicker than those undertaken at the Testing Station the previous summer and were carried out by voluntary helpers using modified equipment and new devices developed and supplied by the Road Research Laboratory. In all 240 vehicles were tested during the three days. It was thought that such tests might serve as a pattern that could be followed by

Road Safety Committees who wished to provide such facilities but whose resources might rule out a more elaborate scheme. The following is a short description of the tests:

Headlights. Measurements of headlights' aim were made with a beam-setter as at the Vehicle Testing Station.

Brakes. An 'emergency' braking stop was carried out from a measured speed of about 20 m.p.h. A chalk pellet was fired automatically on to the road from the car at the instant the brakes were applied, and the distance from its mark to the point at which the car finally stopped was measured to give an indication of braking efficiency at the speed measured. As a supplementary, or alternative, test of braking efficiency a 'Tapley' meter was also used.

Steering. One of the front wheels of the vehicle to be tested was locked in a special clamp, and a predetermined force was applied tangentially to the steering wheel, both clockwise and anti-clockwise. The resultant movement of the steering wheel was indicated on a scale clipped to it, and was taken as a measure of the play in the steering.

Short record films of the procedure in both cases are available. Public interest in the tests and the results observed are referred to on page 44 of Part II.

POLICE ACTIVITY, INCLUDING ENFORCEMENT

GENERAL

The main aim of police activity in the Experiment was to educate road users to observe both the law and the Highway Code. This was done largely by advice and warnings, although it was, of course, necessary for flagrant breaches of the law to be reported so that prosecution could be considered. Persuasion rather than enforcement was, therefore, the underlying principle.

Throughout the Experiment the police supported the propaganda and training schemes which were undertaken.

Periods of special activity were arranged, as described below, in which advice and warnings were given about general road conduct and, in particular, about the observance and use of traffic lights and pedestrian crossings and on the observance of 'No Waiting' areas and 'Halt' signs.

At times when such special activity was undertaken, a police car was taken from general duty to patrol A.4 within the Borough, with instructions, as with the men on foot, to check negligence. On occasions the motor patrol used radar speed-meters for checking the speed of vehicles (see Plate 7), and warned drivers found to be exceeding the speed limit; roadside warning notices were displayed and plain clothes were occasionally worn by the patrol. The motor patrol also conducted tests of efficiency of brakes and the alignment of headlamps on vehicles.

Road safety lectures and the examination of children's cycles by the police at schools were intensified.

The number of police stationed in Slough was inadequate for all the tasks undertaken in the early stages, and additional men, varying from four to six in number daily according to need, were drafted from other Divisions to assist.

PHASING OF POLICE ACTIVITIES

(a) *First phase*

In April, 1955, special police activity as described above was undertaken daily. During that month advice and warnings were given in 2921 cases.

From July to December, 1955, similar activity was undertaken but, because of shortage of manpower, intensified activity involving assistance from other Divisions was not undertaken every day. The varied deployment of the police on selected days is believed to have given the public the impression of continuous intensified activity throughout the Borough in this period.

Advice and warnings were given in this period as follows:

1955	<i>Number of days</i>	<i>Number of cases in which advice or warnings were given</i>
July	26	1 587
August	23	3 081
September	19	1 923
October	21	1 720
November	22	1 487
December	25	1 440
	<hr/> 136	<hr/> 11 238

In July plain clothes motor patrols were introduced, not to get evidence for prosecutions, but to observe the behaviour of drivers when they were not conscious of police being present. In August, the police helped in the campaign to persuade pedestrians to walk on the left on pavements and crossings in the High Street. In October a campaign was launched, continuing until February, 1956, to persuade more persons riding motor cycles to wear safety helmets; posters were displayed and the police advised many motor cyclists to use helmets.

During December, men on duty handed copies of the Highway Code to road users advised about infringing its rules, and the motor patrol again undertook anti-dazzle checks and radar speed checks.

(b) *Second phase*

During the year 1956 no continuous campaign was undertaken, but the police undertook a number of special activities as shown below without assistance from other police Divisions.

FEBRUARY

Following the inauguration of light-controlled crossings in the High Street the police instructed the public in the correct use of the crossings and a watch was kept on the observance by drivers and riders of the traffic signals and of the additional 'No Waiting' restrictions in the High Street and adjoining roads.

APRIL

The police assisted at the children's cycling school.

JUNE

A three months' campaign was begun to check the roadworthiness of pedal cycles.

Some 50 residents were approached about kerb ramps left in street gutters which constituted a danger to road users.

The police warned shopkeepers where sunblinds, awnings, etc., obstructed the footpath and might have caused pedestrians to step off the kerb into danger.

JULY

The pedal cycle campaign continued.

AUGUST

The pedal cycle campaign ended; in all during the campaign 2636 cycles were examined in the streets; 766 were found defective, and 41 persons were reported with a view to prosecution. In addition, 1046 cycles were examined at schools.

A house-to-house campaign by the police was undertaken to reinforce a poster campaign encouraging dog owners to keep their dogs under control. The number of dogs found straying or out of control was 134. The police saw 331 dog owners and stressed to them the importance of keeping their dogs off the streets. A number of people without current dog licences took out new licences and 12 were reported for prosecution.

Activity at pedestrian crossings in the High Street was renewed on similar lines to that in February; in addition use was made of the public address equipment on patrol cars and leaflets prepared by the Road Safety Council about the use of the crossings were distributed to 'jay-walkers'. Advice and warnings were given to a large number of people, but the number was not recorded.

OCTOBER

On 18 days during this month, police activities corresponded to those during July to December, 1955. Advice and warnings were given in 3058 instances, 2475 of these to pedestrians in respect of the pedestrian crossings in the High Street.

(c) *Third phase*

From January to March, 1957, the Slough police, with their existing Divisional manpower, undertook a further intensive campaign designed to improve the behaviour of road users and serve as a check upon the effects of earlier campaigns. On certain days activity was concentrated on particular features but, instead of giving advice and warnings in most cases, as was the rule previously, police officers reported all infringements. Where proceedings were not taken, official cautionary letters were sent by the Chief Constable; with these letters were sent booklets on safe driving or safe cycling as appropriate. In a special effort to reduce the numbers of vehicles parked in the streets, the police attached to vehicles so parked in this period a map showing the location of the three free off-street car parks in Slough.

All patrols played an active part in this campaign, whether or not they had been detailed for a definite duty. During the quarter 634 persons were reported and a detailed analysis is given on page 43 of Part II.

The effects of the measures described above, in conjunction with the educational and propaganda measures undertaken during the Experiment, are discussed further on pages 36 to 45 of Part II.

USE OF POLICE MANPOWER

The number of man-hours worked by the police on duties related directly to the Slough Experiment are given below:

First phase: 1955 (from 2nd April)	5 544
Second phase: 1956	2 011
Third phase: 1957 (to 31st March)	1 278
Total	<hr/> 8 833 <hr/>

ENGINEERING AND TRAFFIC SCHEMES

It was an important part of the Experiment that efforts should be made to improve road conditions where practicable. While schemes designed primarily to assist traffic circulation might have had an indirect result in making physical conditions safer for road users, preference was given to schemes which were most likely to have a direct effect in reducing accidents and which were not unduly costly. Large scale works such as the construction of new roads, fly-overs, foot-bridges or subways were beyond the scope of the Experiment. The main engineering schemes decided upon were traffic light schemes in the High Street and on a two-mile stretch of the Bath Road, the carriageway of the latter also being widened, improvements at certain junctions, experiments in traffic regulation and the provision of a considerable number of bus bays.

For the most part the engineering and traffic schemes, taken as a whole, may be regarded as a stage in a programme of work for dealing with 'accident black spots' in the Borough, that is to say places and lengths of road where accidents were unduly frequent, and they were largely concentrated on the $6\frac{1}{2}$ miles length of the Trunk Road (A.4). Some of the measures were experimental in character. A considerable time must still elapse before most of these measures can be fully evaluated, but preliminary assessments of the results are given on pages 45 to 54 of Part II.

The sites of the various schemes are shown on the key plan. Key numbers on the plan are given as appropriate in the headings below.

HIGH STREET (A.4) PEDESTRIAN CROSSINGS SYSTEM
(12)-(17)

The principal shopping centre lies on the Trunk Road (A.4) between "The Crown" crossroads on the west and the Uxbridge Road junction on the east, a distance of approximately half a mile. It has the typical problems of heavy traffic moving over a relatively narrow carriageway (averaging 30 ft in width), of pavements thronged with pedestrians and of obstructions by vehicles loading and unloading goods at shops.

The major problem was one concerning the very considerable movement of pedestrians and the incidence of accidents in which they were involved. On a weekday in this area about 46 000 pedestrians a day cross the carriageway and evidence had shown that crossing at the light-controlled junctions at either end of the High Street and on the four existing zebra crossings was far safer than crossing elsewhere. It was, therefore, considered that the provision of more and safer crossing places would aid safety.

It was accordingly decided to experiment with the use of progressive traffic signal control, to improve conditions for pedestrians while at the same time

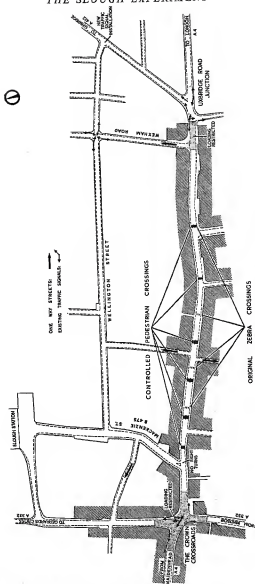


Fig. 2 High Street Pedestrian Crossings System

avoiding undue delay to traffic. (Progressive signal control was also a feature of the experiment on the Bath Road (A.4) west of the town centre, as described in the next section, but, by contrast, it was used there to deal with a quite different problem concerning vehicle accidents, the severity of which was increased by high speeds over a comparatively open section of road.)

The layout of the High Street and its side roads (see Fig. 2) largely suited the replacement of the four zebra crossings within the half-mile length by six light-controlled pedestrian crossings, linked to the signal installation at 'The Crown' crossroads, with progressive timing. It was not, however, possible to link the signals also with those at the Uxbridge Road junction, because of the unusual phasing of the latter. The installation came into operation on 23rd February, 1956, and its general effect is to allow vehicles to proceed in 'waves' at a set speed without interruption, with pedestrians receiving a signal to cross between the waves; turning vehicles and other obstructions sometimes, however, prevent this ideal from being achieved. A master controller counts the number of vehicles entering 'The Crown' junction and automatically varies the cycle time to the density of traffic, progressive speeds varying between 13 m.p.h. under peak conditions and 18 m.p.h. when traffic is light. Central pedestrian refuges were provided wherever possible, that is, at four of the six crossings. (See Plate 8.)

Pedestrian push-buttons are provided at each crossing. An acknowledgement panel displays the word 'WAIT' when the button is pressed (see Plate 9); this indication disappears when the main pedestrian signal changes to 'CROSS'.

For the main pedestrian signals, three different types were used to indicate 'WAIT' in red, and 'CROSS' in green (see Plate 10). These were:

Type A—Orthodox 8 in. diameter roundels.

Type B—Rectangular stencils (approx. 16 in. \times 12 in. in size) illuminated from the rear.

Type C—Rectangular signs (approx. 16 in. \times 12 in. in size) enclosing neon tube lettering.

As to the rectangular signals, only type B was used in the earliest stages, difficulty having been encountered in obtaining sufficient brightness in type C. An inquiry made at this time showed that the great majority of pedestrians who had observed the roundels (type A) and the rectangular signals (type B) felt that the rectangular signals were easier to see. Improved signals of a greater brightness were later evolved as regards both types of rectangular signal (types B and C). Of these improved signals, the Management Group consider that type B is the most satisfactory and, bearing in mind the preference expressed by pedestrians, recommends that all the main pedestrian signals in Slough should, at an appropriate time, be standardized to type B.

For vehicles, standard three-aspect signals were used, extra signal heads being provided to overcome obstruction to drivers' vision by moving and stationary vehicles.

A limited propaganda and police campaign to encourage pedestrians to keep left on the crossings to facilitate free movement met with little success, although some progress was made during special experiments at one crossing. The size of the central island was reduced, a 'Keep Left' bollard was installed at its centre and the pedestrian push-button to the right of the crossing was covered over. Observations taken suggested, however, that such improvement as was achieved by these means deteriorated as soon as their novelty wore off.

Much difficulty had been experienced by through traffic in the High Street because of parked vehicles and traffic entering and emerging from the

uncontrolled side roads, and certain restrictions were introduced to give the new signal system the best chance of success. After consultation with the London and Home Counties Traffic Advisory Committee, regulations were made to impose additional 'No Waiting' restrictions on certain sections of the High Street and on roads in the vicinity. In addition special restrictions to prohibit vehicles from waiting for loading or unloading purposes during the morning and evening peak periods (8.30 a.m. to 9.30 a.m. and 4.30 p.m. to 6.30 p.m.) were imposed on short lengths of roads in the immediate vicinity of "The Crown" crossroads and Uxbridge Road junction. The restrictions on loading and unloading were among the first of their kind in the country. Steps were also taken to reduce congestion at the junctions of the High Street with Wexham Road and Uxbridge Road by the imposition of one-way working in Wexham Road, coupled with the provision of an additional set of traffic signals at Wellington Street/Uxbridge Road junction in order to assist the traffic flow thus diverted. One-way working was also introduced in two other streets in the vicinity of the High Street and one particularly difficult right-hand turn into the High Street (from Mackenzie Street) was prohibited.

The total cost of all the works in connection with the scheme was approximately £21 000. The effects of the scheme are discussed on pages 45 to 49 of Part II.

BATH ROAD (A.4) IMPROVEMENT SCHEME (10)-(1)

This stretch of the Trunk Road (A.4), from the "Three Tuns" crossroads to Huntercombe Lane, is to the west of the centre of Slough and is approximately 2.1 miles in length, passing the frontage of the Slough Trading Estate, thence through the Cippenham shopping area and a residential area to the western boundary of the Borough at Huntercombe Lane. The section about $\frac{1}{2}$ mile in length fronting the Trading Estate is not subject to the 30 m.p.h. speed limit.

In considering accidents on this road, a very different set of circumstances applied from those concerning the High Street. Two problems were involved, one relating to high speeds when traffic volumes are light and the other to the orderly control of traffic emerging from side roads when volumes are heavy. The spacing of the side road junctions largely suited the requirements for a system of linked progressive signals and, having regard also to the problem of high speeds, it was decided to experiment with the use of a 'fixed time' signal system.

Eleven sets of progressively operated traffic signals were installed along the 2.1 miles of road, the system being devised to allow the uninterrupted flow of the majority of vehicles using the Trunk Road once they had entered the system, while checking any excessive speed. During the daytime, including the morning and evening peak periods, provision is made for the through traffic to proceed at a speed of approximately 26 m.p.h., and this speed is increased to approximately 30 m.p.h. during the late evening and at night and also at weekends. Notices about the system were erected at each end of the stretch of road affected (see Plate 11).

The system being an experiment, the equipment was so designed as to permit modifications to be made to it, either during the experiment or after its completion, facilities for the provision of vehicle actuation also being provided.

The signals are linked to a master controller at the Dover Road/A.4 junction (6 on key plan). At this junction, an experiment in the signal control of the adjacent service road was also conducted (see Fig. 3). Elsewhere on the service

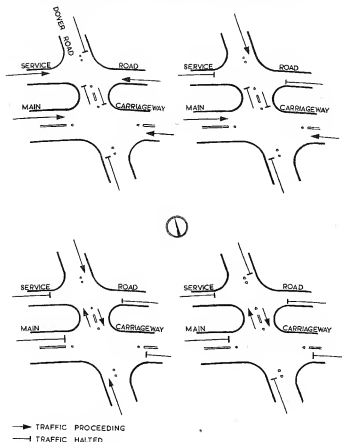


Fig. 3 Junction A 4/Dover Road and adjacent service road—traffic signal phases

road 'Yield' signs (see page 25) were used at junctions with side roads to prevent the service road being used as a slip road without due regard to safety.

In planning the main signal system already described, it was apparent that the existing carriageway would not be capable of passing peak traffic once the signals had been installed and, as a prerequisite of the use of signal control, the length fronting the Trading Estate (where the heaviest traffic occurs) was widened from 30 ft to 40 ft, splaying to 44 ft at the junctions. Where possible, accesses to the adjacent service roads were reduced in number and repositioned

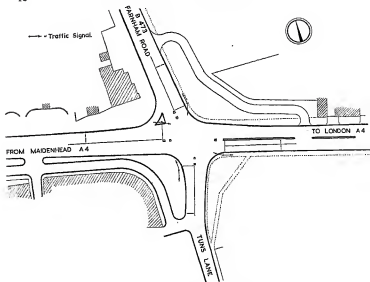


Fig. 4 "Three Tuns" crossroads BEFORE improvement

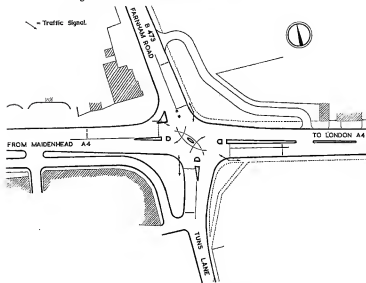


Fig 5 "Three Tuns" crossroads AFTER improvement

to bring them under light control. Island refuges were provided at all junctions and at one comparatively sharp bend a dividing strip some 400 ft in length was provided. At one important local crossroads near Cippenham, known as Everitts Corner (3 on key plan), where much traffic from Slough turns right towards the north, the carriageway was widened to a total of 56 ft to permit three lanes of westbound traffic to draw to the stop line. An existing lay-by for standing vehicles at this point was extended to further reduce interference with through traffic.

Of particular interest are the specially shaped islands provided in the centre of the main road at two junctions to serve as refuges for right turning cyclists and other vehicles (see Plate 12). The turning traffic using these refuges is not itself controlled by signals but is free to move through gaps in the through traffic provided both by natural breaks in the traffic stream and by the operation of the main road signal system.

The road works were carried out during the period October, 1955, to June, 1956, at a cost of approximately £65 000 and the traffic light system, costing approximately £17 000, came into operation on 10th December, 1956. Preliminary results of the scheme are discussed on pages 49 and 50 of Part II.

IMPROVEMENTS AT MAJOR JUNCTIONS ON THE TRUNK ROAD (A.4)

(a) *Junction with Farnham Road (B.473)—“Three Tuns” crossroads (10)*

Route B.473 (Farnham Road) provides one of the principal accesses to the Trading Estate; Tuns Lane, south of the Trunk Road, provides a link road for Windsor traffic. At the crossroads, traffic on the Trunk Road is heavy, with large numbers of vehicles, including many buses, turning right from various directions across the junction.

The junction is signal-controlled but its accident record was one of the worst in the Borough and a high proportion of accidents involved right-turning traffic. Before improvement, refuges existed on all four entering roads; a ‘filter’ lane also existed enabling traffic from the Maidenhead direction to Farnham Road to move without awaiting the green signal. (See Fig. 4.)

It was decided to provide a separate lane for traffic from the London direction making the right turn to Farnham Road, to lessen interference between this traffic and east to west traffic, and also to provide a lozenge-shaped island in the centre of the junction; ‘Keep Left’ signs and road markings were used to direct right-turning vehicles in each direction on the Trunk Road to the left of the island, thus preventing them from passing nearside-to-nearside. Vehicles turning right from Farnham Road and Tuns Lane could not be dealt with in the same way and they were directed by road markings to the right of the island, thus passing nearside-to-nearside. This arrangement has worked quite satisfactorily. The existing refuges east and west of the junction were widened and a local improvement was also carried out in the mouth of Tuns Lane. (See Fig. 5.)

The total cost of this experimental scheme, which was completed in September, 1955, was £2775.

(b) *Junction with Montem Lane (B.3027) (11)*

This is a Y-junction with the second class road B.3027 (Montem Lane) which is used by traffic on the Trunk Road A.4 from the west as a short cut to

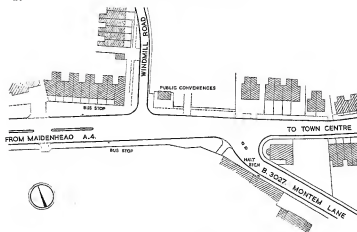


Fig. 6 Montem Lane junction BEFORE improvement

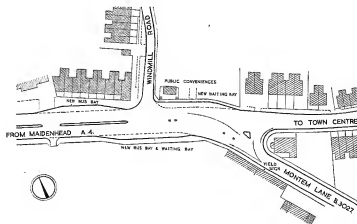


Fig. 7 Montem Lane junction AFTER improvement

the Windsor area (see Fig. 6). There is thus a considerable right-turning movement into the side road and the accident record before improvement was considerable. Vehicles are commonly parked on both sides of the main road at this point, owing to the presence of a public convenience, and these and turning vehicles frequently blocked eastbound traffic on the main road.

The junction was, therefore, redesigned (see Fig. 7). The side road now enters the main road at an acute angle, an island and an additional pedestrian refuge being provided. Traffic may pass in and out of the side road on either side of the island, depending on its direction of turn, the layout forming what is known as a "Bennett" type junction, on the principles advocated by the late Colonel G. T. Bennett, when County Surveyor of Oxfordshire. A lay-by was constructed on the north side of the Trunk Road to accommodate standing vehicles and a further combined lay-by and bus bay was provided on the south side.

The central island on the main road was extended and a further bus bay was constructed to accommodate an existing stop on the north side of the road.

The total cost of this scheme, which was completed in January, 1957, was £4615.

(c) *Junction with Windsor Road and William Street (A.332)—"The Crown" crossroads (12)*

A guard rail was erected on the central island of "The Crown" crossroads in the centre of Slough. This improvement was completed in November, 1955, at a cost of £10.

(d) *Junction with Ditton Road (A.331) and Langley High Street (B.470)—"William IV" crossroads (20)*

In 1951 improvements were made to this junction and, traffic volumes being such as to require it, arrangements were made at that time to permit subsequent signal control. The signals were installed in August, 1956, at a cost of about £1800.

(e) *Junction with Old Bath Road (B.3378) and Sutton Lane—"The Colnbrook roundabout" (21)*

The "Colnbrook roundabout" is situated on the Trunk Road A.4 at the western end of the Colnbrook By-pass (see Fig. 8). A somewhat complicated system of islands forms, in effect, an elongated roundabout, with its longer axis in an east to west direction. There is a 'cut' through the centre of the main island which permits traffic either from the west or from Sutton Lane to turn into the Old Bath Road. The layout had not proved particularly satisfactory and accidents had occurred, mostly at the northern entrance of the 'cut' and also at the junction of Sutton Lane with the Trunk Road.

Plans exist for the construction of a more orthodox roundabout but, since the provision of large-scale works was beyond the scope of the Experiment, experimental changes were made with the object of seeing whether minor improvements would have the effect of reducing the accident rate (see Fig. 9).

A bus bay has been provided a short distance west of Sutton Lane. A deceleration lane has also been provided for traffic turning left into Sutton Lane from the west and the existing refuge in the mouth of Sutton Lane has been replaced by a larger directional island. Lane markings have been provided on the eastbound carriageway, including the marking of a right-turning lane, particularly for the use of cyclists, protection being given to this turning traffic by a projecting kerb at the western end of the island. The existing islands have

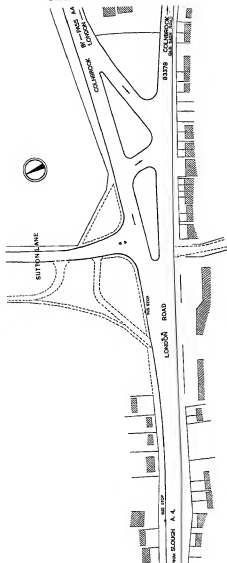


Fig. 8 "Colnibrook roundabout" BEFORE improvement

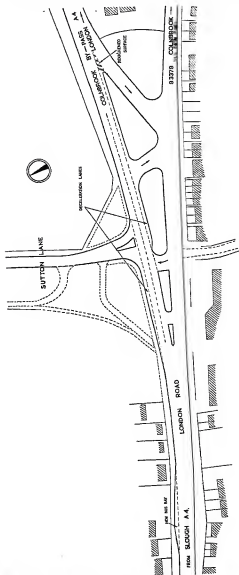


Fig. 9 "Colnbrook roundabout" AFTER improvement

been varied to facilitate the right turn from the east into Sutton Lane and to prolong the segregation of eastbound and westbound traffic. To the east a roughened surfacing gives warning to traffic of the imminence of a dividing island (see Plate 13).

The cost of this scheme was approximately £2700. Work was not able to be started until after the end of the two-year experimental period and it was completed early in July, 1957.

OTHER JUNCTION IMPROVEMENTS (5), (9), (13), (14)

In addition to the above improvements at major junctions with the Trunk Road A.4, a comprehensive review of accidents at minor road junctions was carried out and the sum of approximately £2000 was spent by Slough Borough Council on the improvement of vision, kerb radii, etc., at four such junctions on district roads. A number of other minor improvements were made during the period at junctions on the Trunk Road A.4 and classified roads.

BUS BAYS

To permit the free flow of traffic and improve safety in the vicinity of bus stops, sixteen bus bays were constructed, including those already described; fourteen are on the Trunk Road (A.4). (Sites are marked 'X' on key plan.)

CARRIAGEWAY MARKINGS

Considerable difficulties had been encountered in Slough over the enforcement of 'No Waiting' regulations and, with the approval of the Ministry, the Borough Council had carried out trials prior to the Experiment of various methods of continuous marking, including the application of yellow paint to kerbs, to supplement the existing 'No Waiting' signs and to assist drivers to recognize the existence and limits of the areas to which the signs applied. Following further trials, a 4 in.-wide yellow plastic line on the carriageway surface some 12 in. from the kerb was applied experimentally to all 'No Waiting' areas in the Borough. As a distinction, areas subject also to loading restrictions were provided with two parallel yellow lines on the carriageway (see also under " 'No Waiting' signs" on page 26).

Efforts were also directed to the provision and maintenance of standard white line markings and 'cats'-eyes' on carriageways wherever desirable. In particular, the whole of the Trunk Road A.4 in Slough was marked to segregate traffic into lanes. At certain extremely sharp bends and other hazards, wider white line patterns were adopted experimentally to emphasise the dangers (see Plate 13).

In December, 1956, certain major junctions were marked experimentally with advance signs on the carriageway in the form of tees or crosses as a warning to drivers, particularly in fog, that they are approaching a road junction; these are basically similar to the 'aids to movement' used during the war-time 'black-out'. The use experimentally of amber 'cats'-eyes' in one such marking did not prove to be of value and was discontinued. It has not yet been possible to evaluate the effects of these markings generally.

Limited experiments carried out with two types of luminous white line markings produced no conclusive results, mainly because of the generally good standard of the street lighting, and the experiments were not pursued.

USE OF REFLECTOR POSTS—WESTLANDS BENDS (2)

A prolonged double bend on the Trunk Road A.4 near the western boundary of the Borough, known as the Westlands Bends, had been found to be deceptive in character, a number of vehicles having taken the bends at too high a speed and run off the road.

In June, 1956, posts carrying standard 6 in. diameter reflective metal discs were erected on both sides of the road at intervals varying from 20 ft to 60 ft along the full length of the bends to delineate them.

STREET LIGHTING

The lighting along the whole length of the Trunk Road A.4 in the Borough, which is of the mercury vapour type, has been progressively brought by the Slough Borough Council up to the Group 'A' standard. By April, 1953 (the date from which the casualty and accident statistics considered in Part II begin), the lighting of four miles of the Trunk Road in the centre of the Borough had been brought to Group 'A' standard; the remaining $2\frac{1}{2}$ miles were completed between April, 1955, when the Experiment began, and April, 1956. In addition, improvement in street lighting to Group 'B' standard was carried out in a number of secondary roads in different parts of the Borough during the period of the Experiment.

These lighting improvements did not form part of the Experiment, but the effect of the improvement on the Trunk Road is referred to on page 52.

The Road Research Laboratory erected a trial lighting system on a half-mile length of the Colnbrook By-pass (A.4), which came into operation on 14th November, 1956 (22 on key plan). The lit stretch is just outside the Borough boundary, and although the trial was not strictly a part of the Experiment the Management Group took a close interest in it. The spacing of the lanterns is about three times the normal spacing; it was recognised that this would create dark areas, and drivers were advised to use dipped headlights, but increased safety was expected from the probability that the lamps would reveal objects on the road a long way ahead (see Plate 14). On the stretch of road selected, the lighting serves as a useful transition between standard lighting and darkness. The purpose of the trial, which necessarily will be over a long period, is to see if a system of lighting less costly than that which is standard in urban areas would be valuable in reducing accidents at night on a formerly unlit stretch of road.

TRAFFIC SIGNS

The opportunity was taken during the Experiment to make various trials in the use of traffic signs.

(a) '*Yield Right of Way*' signs

Some justification was considered to exist for the provision of a sign at junctions with a major road which would be rather more positive than the existing 'Slow' sign, yet would not impose upon the driver the absolute necessity to 'Halt' in conditions when this appeared to be unnecessary.

It was therefore decided by the Ministry of Transport and Civil Aviation to conduct an experiment over a selected area, including Slough, in the use of a sign similar in character to the 'Yield Right of Way' signs as used in the United States. A standard pattern was evolved by the Ministry (see Plate 15) and the erection of the 'Yield' signs was authorised at fifteen road junctions in the

Borough. (Sites are marked 'Y' on key plan.) Comments on the effect of the signs are made on page 53 of Part II.

(b) *'No Waiting' signs*

The siting of existing signs in the Borough indicating waiting and loading restrictions was improved and some augmentation was arranged.

(c) *Direction signs*

It was felt that clear and adequate direction signing could make a valuable contribution to road safety and a revised and co-ordinated system of advance direction signs, embodying improvements both in siting and in the information given, was worked out covering all principal road junctions within the Borough. Some unorthodox advance direction signs based on American and Continental practice were evolved for comparison with the present standard type of sign (see Plate 16). It was not possible to erect signs in accordance with these plans during the course of the Experiment, but they are to be erected as soon as possible and their effects will be carefully observed.

(d) *General—Siting and visibility of signs*

Many detailed matters affecting direction signs, warning signs, car park signs, etc., in the Borough, including the fitting of backboards to signs to make them more easily visible, were also examined and action was taken as necessary; many suggestions were made by the general public, and by the Slough Junior Chamber of Commerce in particular, in response to a general appeal for ideas based on local experience for improving traffic signs in Slough.

CONTINENTAL-TYPE BOLLARDS

A proposal to use low bollards of the domed type (as widely used in France and elsewhere) at the centre points of crossroads, or in place of standard bollards, was not proceeded with, since it was felt that their introduction on a limited scale would constitute an unexpected and serious hazard to cyclists and motor cyclists.

SPEED LIMITS

Consideration was given to the possibility of imposing new speed limits as a means towards the reduction of accidents.

An experimental speed limit of 20 m.p.h. was planned for two routes which are in common use by east-west traffic wishing to avoid the congested town centre, and which were considered unsuitable for heavy traffic at speeds approaching 30 m.p.h.

Plans were also made for a 20 m.p.h. speed limit in the narrow Langley High Street (B.470), which passes through a populated area; it is flanked on its western side by a newly developed housing estate and there is some housing development on its eastern side.

At the same time, the London and Home Counties Traffic Advisory Committee, at the request of the Minister of Transport and Civil Aviation, were investigating the desirability of introducing a 40 m.p.h. speed limit on certain roads in London and the Home Counties, and included in their recommendations a proposal that such a limit should be provided on a length of $1\frac{1}{2}$ miles of the Trunk Road (A.4) from the eastern boundary of Slough to Lynwood Avenue; this length is at present unrestricted.

The lengths of road affected by these proposals are shown on the key plan.

A number of objections, both local and national, were lodged following advertisement of the proposals, and a Public Inquiry was held by the London and Home Counties Traffic Advisory Committee. Following the Inquiry, the Minister approved the proposal to institute the 40 m.p.h. speed limit on the Trunk Road (A.4) as recommended, as a part of a general scheme for introducing 40 m.p.h. limits in the London area, but, as regards the proposals for 20 m.p.h. limits, accepted that for Langley High Street only.

The speed limit of 20 m.p.h. in Langley High Street will come into effect in the near future. The 40 m.p.h. limit on A.4 is expected to be introduced on 1st January, 1958.

OTHER MEASURES

Miscellaneous measures which were not part of the Experiment may have affected the safety of the roads in Slough during the two-year period, though the effect will have been slight in relation to the total number of accidents. Apart from the street lighting improvements within the Borough referred to on pages 24 and 25, these included the provision of much additional off-street car parking space, the introduction of 'No Waiting' and 'One Way' restrictions on certain roads unconnected with the experimental measures already described, and the carrying out of the normal programme of re-surfacing and maintenance work on roads in the Borough. Other factors to be taken into account are the temporary interference with the flow of traffic and hazards caused by the road works themselves while they were in progress, and in particular by those carried out on the Trunk Road. (The Road Research Laboratory have shown, from studies made during road works in London, that road works have the effect of increasing accident frequencies.) Similarly, road works required for G.P.O. cable laying, etc., may have adversely affected safety; the extent of such work happened to be greater during the period of the Experiment than normally.

PART II

Assessment of Results

INTRODUCTORY

The assessment of the results of the Experiment in this part of the Report has been prepared by the Road Research Laboratory of the Department of Scientific and Industrial Research and the Social Survey Unit of the Central Office of Information, largely on the basis of direct observations and analyses which they have made. Studies will continue to be made over a considerable period and the assessment is, therefore, provisional.

It should be noted that the road safety measures undertaken in the Experiment were mainly aimed at:

- (i) improvement of road users' behaviour so that they would be less likely to make the mistakes which lead to accidents, or
- (ii) improvements of road conditions, in order to give less scope for human error.

Although attention was also given to the problems of defective vehicle maintenance, this was mainly with a view to ascertaining their nature and extent, and a continuous effort to improve standards of maintenance did not form part of the Experiment.

No assessment has been possible in certain cases of the individual effects of the various measures undertaken. In some there is an overlap; others were introduced too recently for their effects yet to be observable, and more information is expected from later investigations.

In this part of the Report, an overall assessment of the effects of the Experiment as a whole is first made, based on all the accidents occurring in the Borough. This is followed by detailed studies of the various measures, dealing first with those in category (i) above. These measures, if successful, would be expected to operate in three stages: firstly by influencing people's outlook and attitude to the road accident problem, then by making them use the roads in a safer manner, and leading finally to a reduction of accidents. The measures, however, were of such a form as to make it difficult to observe directly their effects on accidents. Studies were, therefore, made of their effects on attitude and behaviour. It should be observed, however, in this connection that it is not claimed that apparently favourable changes in attitude which have been registered are necessarily beneficial; for example an increased feeling of safety might result in less care being taken. It is nevertheless important and useful to record the changes that occurred.

This section of the Report also includes briefly the findings which were made in relation to standards of vehicle maintenance and shows the response of the public to the vehicle testing facilities which were provided.

Engineering and traffic schemes in category (ii) above have been more amenable to study by accident statistics, because their effects are more localized, but the numbers of accidents involved are relatively small and sufficient time has not yet elapsed for all their separate effects to be manifest. The results are given of some studies of attitude and behaviour relevant to these measures.

This Part of the Report concludes with some observations on the attitude of the public generally to the problems of road safety.

THE EFFECTS OF THE EXPERIMENT AS A WHOLE

FACTORS AFFECTING CASUALTY AND ACCIDENT STATISTICS

In considering the general results of the Experiment, clearly the main concern is to see if the numbers of reported accidents and casualties in the Borough during the period of the Experiment show a decrease compared with the numbers in some earlier period, allowance being made for changes in any conditions or factors which were not part of the Experiment. It was considered that the period April, 1953, to March, 1955 (i.e. the two years immediately before the Experiment started), formed a suitable datum period. The effect of external factors is best taken into account by comparing the change in accidents in Slough with that in the country as a whole over the two periods, allowance being made as far as possible for changes as between Slough and elsewhere in population and traffic, which are thought to be the most important factors. In due course a similar study will be possible of accidents occurring after the end of the two-year period.

No comparisons are made with numbers of accidents in a 'control' town, whose characteristics inevitably would be dissimilar from those of Slough.

Population

The average population of Slough during the Experiment was, in fact, 2.5 per cent higher than in the 1953-55 period, whereas the average population of the whole country was only 0.8 per cent higher. The growth in the population of Slough was due primarily to the development of the new housing estate at Langley within the Borough. In what may be termed 'Greater Slough' (within a line drawn half a mile outside the Borough boundary) there was much additional housing development, and the population of this area increased by 6.4 per cent as between the two periods. Many of the newcomers probably work, go to school or shop in Slough, adding to its effective population.

It should also be noted that in 1955-57 12½ per cent more children were attending schools in Slough and the immediate neighbourhood, compared with a national increase of 4 per cent.

Traffic

The data available for comparing the traffic in Slough during the Experiment with that before are limited. Some of the data consist of sample counts made in August, 1954, 1955 and 1956, at the 14 sites shown in Appendix 2. The results in the form of indices, are shown in Table I, and are compared with those

Table I
Traffic flow indices for the average week in August,
excluding Bank Holiday week

Sites	1954	1955	1956	Average 1955 and 1956
Slough (14 sites)	100	110	113	112
England (2 sites outside London).	100	116	118	117
London (4 sites)	100	105	111	108
Colnbrook By-pass	100	103	118	110

obtained from sites elsewhere. One of these is two miles east of Slough, on the Colnbrook By-pass, which leads directly into the Borough with no side turnings of any importance along its length. At this site continuous long period counts are available and form the other source of basic information relevant to Slough traffic.

The variations in the figures in Table I are somewhat erratic, and demonstrate that caution must be used in drawing conclusions from counts based on comparatively short periods and on small numbers of points. It will be noted, however, that when the averages of the figures for 1955 and 1956 are considered, the figure for Slough is about of the same order as that for the Colnbrook By-pass.

The more extensive counts on the Colnbrook By-pass showed that 9.3 million vehicles travelled on this road during the Experiment, and that this number was 22 per cent higher than that for the 1953-55 period; the corresponding increase in traffic at four points elsewhere in England at which continuous counts were taken was 12 per cent.

A further point to be considered is that the Slough traffic counts were all made on main roads, and there is some evidence that traffic on side roads in Slough has increased more than on the main roads; for example, there was an unrecorded volume of traffic on the roads of the new housing estates which did not exist before.

Taking all these factors into account in comparing the complete 1953-55 and 1955-57 periods and, bearing in mind the limited data available, it seems reasonable to assume that the total traffic on all roads in Slough increased by at least the same amount as in the rest of the country.

TOTAL REPORTED CASUALTIES AND ACCIDENTS

Table II summarizes the numbers of reported casualties and accidents in Slough during the Experiment and in the previous two years, with comparative figures for changes in Great Britain as a whole. The standard classification of fatal, serious and slight casualties has been used, as follows:—

Fatal: Cases in which death occurs within 30 days of the accident.

Serious: Fractures; concussion; internal injuries; crushings; severe cuts and lacerations; severe general shock necessitating medical treatment and any other injury involving removal to and detention in hospital.

Slight: Injuries of a minor character such as sprains or bruises. Persons who complain of shock but who sustain no other injury are not included, unless they exhibit some clear symptom of shock and receive or appear to need medical treatment.

It will be seen that in Slough the graver casualties (i.e. fatalities and casualties classified as 'serious') fell in number during the two years of the Experiment by 25, or 10 per cent; in Great Britain the corresponding total increased by 9 per cent. If the 'slight' casualties are included, the total figure of casualties in Slough increased by 14 per cent, compared with a national increase of 15 per cent. All reported accidents in Slough (i.e. as distinct from the casualties involved, and including 'damage only' accidents) increased by 7 per cent, and, while no national figures are available for comparison, it is estimated from sample returns that these increased by about 13 per cent. Thus, whatever defining line is taken, there is an apparent reduction compared with the national figures,

except in the case of fatalities, which increased from 11 to 13, an increase of 18 per cent, compared with an increase of 9 per cent in the corresponding figures for Great Britain.

Table II
Summary of statistics of reported casualties and accidents

CASUALTIES

	Slough			Great Britain
	1953-55	1955-57	Change	Corresponding change in country as a whole
			per cent	per cent
Fatal . . .	11	13		
Serious . . .	252	225	- 10	+ 9
Slight . . .	650	806	+ 24	+ 17
Total . . .	913	1044	+ 14	+ 15

ACCIDENTS

	Slough			Great Britain
	1953-55	1955-57	Change	Corresponding change in country as a whole
			per cent	per cent
Fatal . . .	11	12		
Serious . . .	226	205	- 8	+ 9
Slight . . .	571	681	+ 19	+ 15
Total . . .	808	898	+ 11	+ 13
Damage only .	1239	1283	+ 4	Not available
Total . . .	2047	2181	+ 7	Not available

While it is convenient to compare the changes in Slough with those in Great Britain as a whole, it might be thought desirable to compare them also with those in a smaller area surrounding Slough. A convenient area for this purpose is that made up of the South Eastern, Metropolitan and Eastern Engineering Divisions of the Ministry of Transport and Civil Aviation. The increases in the numbers of casualties in this area were in fact greater than the national changes, so that the use of Great Britain for the purposes of comparison may well tend to under-estimate the effects of the Experiment in Slough.

Table II shows a marked discrepancy between the changes in the numbers of fatal and serious accidents and casualties and of minor accidents and casualties. A similar, but less marked, difference is noticeable in the national figures.

ACCIDENT REPORTING

It is considered probable that one factor leading to this discrepancy in Slough has been an increase in the completeness of reporting of accidents to the police. If certain formalities are observed, accidents otherwise required to be reported need not be so reported. Although no changes were made in police procedure,

the increased attention given to road safety by the police in Slough and the increased interest in it on the part of the public may well have resulted in a larger proportion of slight accidents coming to notice during the Experiment than in the preceding two years.

Thus, the apparent increases in slight injury and damage only accidents in Slough as shown in Table II are probably greater than the real increases. These considerations probably do not apply to accidents involving fatalities or serious injuries, which by their nature would almost invariably have become known to the police in both periods.

THE EFFECTS OF INCREASED POPULATION AND TRAFFIC

The effect of the changes in population and traffic in Slough as against changes elsewhere is now considered. Relatively, the Borough population increased by 1.7 per cent (i.e. 2.5 per cent minus the national increase of 0.8 per cent) and that of 'Greater Slough' by 5.6 per cent (6.4 per cent minus 0.8 per cent). It is not known exactly what numerical effect on accidents population and traffic changes have, but, in view of the traffic data discussed above, it is reasonable to say that, if there had been no Experiment, the number of fatal and serious accidents would have been expected to increase at least 2 per cent more than in the country as a whole. In other words, an increase of at least 11 per cent would have been expected, whereas in fact there was a *fall* of 8 per cent, and it is unlikely that this difference is due to chance; the net result is thus a reduction, compared with the country as a whole, of nearly 20 per cent or one-fifth.

The estimate of the effect of population and traffic increases is a conservative one, and the above results provide a strong indication that the Experiment as a whole has had a real effect in reducing the accident rate in Slough.

DETAILED ANALYSES

In the following detailed analyses, owing to the abnormal conditions which were brought about by the fuel restrictions beginning in November, 1956, later figures are not given, and comparisons are made with the corresponding period in 1953-54.

(a) *By classes of road user*

Table III analyses the casualties by class of road user. Adult pedestrians showed a considerable improvement; they, with adult pedal cyclists, formed the only groups in which total casualties fell. There was an overall increase in reported casualties to riders and passengers of motorcycles, but the number of serious casualties among them fell. Child pedestrian casualties remained about the same, but slight casualties among child cyclists greatly increased; these casualties must be viewed in the light of increases in the school population in Slough during the Experiment (see page 29). Serious and slight casualties among drivers and their passengers also increased.

It should be noted, however, that the effects tend to be similar in the corresponding national figures; thus, in the case of total casualties, pedestrians and adult pedal cyclists showed the smallest increases and drivers the largest.

Table III
Casualties by class of road user

	Apr., 1953–Nov., 1954			Apr., 1955–Nov., 1956			Change			
	Fatal	Serious	All Casualties	Fatal	Serious	All Casualties	Slough		Great Britain	
							Fatal and Serious	All Casualties	Fatal and Serious	All Casualties
Pedestrians:										
Child (under 15)	1	16	69	—	16	73	per cent — 6	per cent + 6	per cent + 2	per cent + 5
Adult	1	33	102	4	32	85	+ 6	— 16	+ 5	+ 8
Total	2	49	171	4	48	159	+ 2	— 7	+ 4	+ 7
Pedal cyclists:										
Child (under 15)	1	7	32	—	9	39	+ 12	+ 84	+ 9	+ 16
Adult	2	66	285	2	48	263	— 26	— 7	— 8	+ 1
Total	3	73	317	2	57	324	— 22	+ 2	— 4	+ 4
Motorcyclists:	3	61	164	3	49	218	— 19	+ 33	+ 19	+ 20
Passengers	—	9	36	2	6	50	— 11	+ 39	+ 13	+ 23
Total	3	70	200	5	55	268	— 18	+ 34	+ 18	+ 28
Drivers:	1	11	41	—	18	70	+ 50	+ 71	+ 32	+ 36
Passengers	1	17	63	1	18	97	+ 6	+ 54	+ 19	+ 24
Total	2	28	104	1	36	167	+ 23	+ 61	+ 24	+ 28
TOTAL	10	220	792	12	196	918	— 10	+ 16	+ 11	+ 17

(b) *By vehicles involved*

Table IV shows the types of vehicles involved in accidents in Slough and in Great Britain as a whole. The differences between the changes in Slough and those in the national figures are not significant.

Table IV
Vehicles recorded by the police as 'primarily' involved in personal injury accidents

Type of vehicle	Slough April, 1953– Nov., 1954	Slough April, 1955– Nov., 1956	Change in Slough	Change in Great Britain
Goods	93	113	per cent + 22	per cent + 16
Motorcycles	145	179	+ 23	+ 22
Pedal cycles	197	207	+ 5	0
Cars and taxis . . .	228	245	+ 7	+ 26
Public service vehicles .	25	34	+ 36	+ 6
Total	695*	788*	+ 13*	+ 16†

* Including other types not specified.

† Excluding other types.

(c) *By residence of persons involved*

Table V shows the percentages of persons involved in accidents who were residents of Slough. The percentages before and during the Experiment are very similar and there is no evidence here to indicate that residents profited more than non-residents.

It is of interest to note that the figures follow the expected trend; pedestrians and cyclists involved are most frequently residents and drivers are most frequently visitors.

Table V
Percentage resident

	Drivers and Cyclists					Pedestrians	Total
	Goods	Motor-cycles	Pedal cycles	Cars & taxis	Buses		
	per cent	per cent	per cent	per cent	per cent	per cent	per cent
Apr., 1954-Mar., 1955	30	50	76	36	24	83	44
Apr., 1955-Nov., 1956	30	52	73	36	13	77	43

Although no changes of statistical significance have been observed in Tables III, IV and V, this is not inconsistent with the possibility that an Experiment of longer duration might have revealed such differences.

(d) *By roads in which accidents occurred*

Table VI shows a reduction of 6 per cent in personal injury accidents on the Trunk Road (A.4) and varying increases on other roads. These variations are statistically significant.

A more detailed analysis shows that the benefit on A.4 was generally most marked on the section known as the Bath Road i.e. from Burlington Road (280 yds west of "The Crown" crossroads) to the western boundary (12-1 on key plan). The detailed analysis also shows that the greatest increases in personal injury accidents on other roads occurred in the Langley, Wexham Road and Windsor Lane areas; these increases may have been associated with increased traffic and pedestrian activity resulting from housing development schemes in or near those neighbourhoods.

Table VI
Accidents by Class of road

Class of Road	Personal injury accidents			Damage only accidents			All accidents
	Apr., 1953-Nov., 1954	Apr., 1955-Nov., 1956	Change	Apr., 1953-Nov., 1954	Apr., 1955-Nov., 1956	Change	Total Change
Trunk Road (A.4).	314	295	per cent - 6	508	557	per cent + 10	per cent + 4
Class I	62	79	+ 27	132	145	+ 10	+ 15
Class II	81	94	+ 16	94	106	+ 13	+ 14
Class III	96	130	+ 35	111	131	+ 18	+ 26
Unclassified:							
Langley Estate	—	12	N/A*	—	7	N/A*	N/A*
Other	142	178	+ 25	178	187	+ 5	+ 14
Total	695	788	+ 13	1023	1133	+ 11	+ 12

* Not applicable.

TRENDS IN CASUALTIES DURING THE EXPERIMENT

The introduction of the various experimental measures was phased, as shown in Appendix 1, and their effects might be expected to be cumulative; there is some evidence that this occurred. Appendix 3 shows casualties in Slough by classes of road user for quarterly periods against the numbers which would be expected had they changed in proportion to the national figures.

In this connection it should be noted that the annual average of the traffic flow in Slough during the second year of the Experiment was nearly 5 per cent below that in the first year, and there was a fall in the national traffic estimated at a little over 3 per cent. On the other hand, Slough's population increased by 1.7 per cent, the national increase being 0.4 per cent. Thus traffic and population changes between the two years tended to cancel each other.

Pedestrian casualties were higher than expected in the first six months, but thereafter were consistently lower than expected, and showed an increasing tendency to improve. Casualties to drivers and their passengers were higher than expected throughout, and particularly so in the first six months, although they also showed a fairly steady improvement later. There were no marked variations or trends during the Experiment in casualties to motorcyclists and cyclists.

In January to March, 1957, fuel rationing cut Slough traffic by 19 per cent (and national traffic by 18 per cent) and casualties to drivers and passengers in Slough fell by two-thirds compared with the corresponding period in 1956. This reduction is much greater than might have been expected from reduced traffic alone. It is possible, therefore, that the educational and engineering measures undertaken during the Experiment, and in particular the intensive police activity during the 1957 period, had an effect on accidents resulting in casualties to drivers and their passengers. Casualties to motorcyclists and pedal cyclists did not, however, show the same effect and the actual figures are too small to provide conclusive results.

It is encouraging to note that the general downward trend has continued. During the three months following the official end of the Experiment (April-June, 1957), fatal and serious casualties in Slough were 10 per cent below those a year previously, compared with a national increase of 4 per cent between these periods; total casualties fell by 11 per cent in Slough against a national increase of 2 per cent. Traffic volumes fell between these periods by an estimated 3 per cent in Slough and by an estimated 2 per cent nationally.

VEHICLE SPEEDS

In considering measures to reduce accidents regard must be had to any effects of those measures on the speed of traffic. Information about vehicle speeds in Slough has been obtained by various methods, including timing the journey of a test car filtered into the traffic and measurement of spot speeds with a radar speed-meter.

(a) Speeds on A.4 and alternative 'southern by-pass' route

Appendix 4 shows the journey speeds in the late summer of 1956 on various sections of the two routes shown in Appendix 2 (A.4 and the alternative 'southern by-pass' route, continuing on to Farnham Road). The average flows of traffic over a longer period are also given. This shows the characteristic feature that in the evening peak (5 p.m. to 6.15 p.m.), when flows were about

40 per cent higher than during the working day (9.30 a.m. to 5 p.m.), speeds were generally lower; on the other hand, in the High Street sections speeds were slightly higher, probably because there were fewer pedestrians and parked vehicles about at that time of day. Speeds on these two routes are discussed further in connection with the High Street traffic lights (pages 45 to 49), and speeds on the Bath Road section of A.4 are discussed on pages 49 and 50.

(b) *Speeds elsewhere in Slough*

Observations of the speeds of traffic in Slough generally were also taken; these referred to evening speeds, and the results in Table VII were obtained.

Table VII
Speeds and flow during the evening at 10 sites in Slough

	March, 1955	May, 1955	March, 1956	May, 1956
Average speed (all sites combined)	30.4 m.p.h.	30.6 m.p.h.	29.7 m.p.h.	30.9 m.p.h.
Proportion of vehicles exceeding 30 m.p.h.:—				
(i) unrestricted sites	61 per cent	63 per cent	60 per cent	72 per cent
(ii) restricted sites (i.e. subject to 30 m.p.h. speed limit)	44 per cent	47 per cent	46 per cent	46 per cent
Flow, total of 10 sites (v.p.h. = vehicles per hour)	3400 v.p.h.	4400 v.p.h.	4000 v.p.h.	5000 v.p.h.
Proportion of private cars	77 per cent	79 per cent	78 per cent	79 per cent

Speeds in 1956 were about the same as those in 1955, although traffic flow increased by 15 per cent. Thus there is no evidence that speeds generally were markedly affected by the experimental measures.

The effects on speeds of police checks made with radar speed-meters are referred to on pages 43 and 44.

STUDIES RELATED TO EDUCATION AND POLICE ACTIVITY, INCLUDING ENFORCEMENT

During the Experiment, as was explained in Part I of the report, the police co-operated fully in the general aim of seeking to improve road behaviour in the interests of greater road safety, relying as far as possible on advice and warnings rather than on law enforcement. Propaganda of a general nature, based on the Highway Code, was supported throughout the Experiment by advice given by the police to individuals. In addition, however, attention was concentrated from time to time on specific points. For the most part, it is not possible to assess separately the effects of the advice given to road users through propaganda media, such as posters and notices, and that given by police officers.

ATTITUDE OF THE PUBLIC TO THE EXPERIMENT

Six months after the start of the Experiment 83 per cent of resident pedestrians questioned and 67 per cent of others who either worked in Slough or lived

within ten miles of it, had heard about the Experiment. A year later 90 per cent of all pedestrians had heard of it as also had 70 per cent of visiting drivers and cyclists. These percentages are high and are considered to speak well for the publicity measures undertaken.

ATTITUDE TO PROPAGANDA

In March, 1955, before news of the Experiment had been announced, about 60 per cent of pedestrians interviewed, and 40 per cent of other road users, thought the road safety publicity in Slough inadequate. 30 per cent in each case were satisfied with the amount of publicity and a minority of less than 5 per cent wanted less. Definite changes were noticed as the Experiment progressed and by 1957 only about 25 per cent of pedestrians and 15 per cent of other road users wanted more publicity. The majority of each group were satisfied, but the minority wanting less publicity had risen to 10 per cent amongst pedestrians and to over 15 per cent amongst other road users.

The figures suggest that the increased level of publicity was acceptable to the public generally, and remained so throughout the Experiment. In the later stages, however, a considerable minority of road users other than pedestrians considered that publicity was, in some respects, overdone. If they referred, as might be expected, principally to roadside publicity, this suggests that explanatory notices (such as those preceding the Bath Road traffic lights) in conjunction with ordinary publicity material and the numerous physical changes that were introduced during the Experiment were cumulatively responsible. Some such result was perhaps inevitable during a period of rapid change.

During the first six months of the Experiment there were very considerable gains, which were maintained later, in the proportion of road users who had recently noticed various types of road safety publicity.* Amongst all road users the proportion who had noticed it in the streets increased by over 30 per cent and there was an equally large gain amongst drivers and riders as regards publicity at the approaches to Slough. An additional 25 per cent of local pedestrians had noticed it in buses, and an additional 20 per cent in shops or shop windows. The boundary notices, and the 10 000 posters put up in the course of the Experiment in the streets and on buses, seem therefore to have made a real impact on road users; publicity in shops was undertaken only to a limited extent, but this relatively small effort appears to have produced good results. In March, 1955, 29 per cent of pedestrians resident in Slough recalled seeing something about road safety in the two local newspapers in the preceding three months. By September, 1955, the proportion had risen to 64 per cent, though thereafter it fell gradually to a final figure of a little under 50 per cent. The local press proved, therefore, to be a most helpful publicity medium.

A high proportion of residents remembered the brochures issued to them. In September, 1955, 61 per cent remembered receiving the one issued in April, 1955, and in September, 1956, 68 per cent remembered receiving that issued in June, 1956. Six months later these proportions had fallen by only 5 per cent to 6 per cent. In the case of both brochures, 70 per cent of those who remembered

* Road users were questioned in each case about publicity seen in the three months prior to interview. Answers to questions of this sort have sometimes been found to produce an over-estimate of the proportion who have actually seen an item in the stated period. These results have, therefore, been given only in terms of the gains achieved during the Experiment.

receiving one said definitely that they had kept it. Letter-box delivery could result in only one person in a household seeing the document delivered, and even in the case of so widely publicised and nationally important a booklet as that which described the new National Insurance Scheme in 1948, shortly after postal distribution only 80 per cent remembered having seen it. The above results of letter-box delivery of brochures in Slough may therefore be considered satisfactory.

ATTITUDE TO TRAINING SCHEMES

The proportion of persons other than pedestrians who had heard about the Juvenile Cyclists Club increased from 23 per cent in March, 1955, to an average of 32 per cent during the Experiment; for the learner motorcyclist training scheme the increase was from 27 per cent to 34 per cent and for motorists' refresher courses from 31 per cent to 41 per cent. Publicity in these respects thus had a positive effect. In all five enquiries most road users (64 per cent to 71 per cent) said they thought schemes of this sort were useful; a minority (16 per cent to 21 per cent) took the opposite view and a smaller minority (about 10 per cent) said explicitly that they could do good only if the right people would attend them. About 50 per cent said they would definitely consider taking such a course themselves if there was one available which they thought appropriate; 30 per cent said they would not consider it; the others were doubtful.

The initial demand for training facilities was also shown by the receipt of pro-formas included in the first brochure, in which residents were asked to indicate the schemes in which they were interested. This showed 35 people interested in the learner training scheme for motorcyclists, 80 in motorists' refresher courses and 40 in rallies.

ROAD USER BEHAVIOUR

In considering propaganda and police activity and their effects on road user behaviour, it should be noted that the activity was undertaken mainly with the object of improving behaviour in general rather than in the particular respects detailed below. There were, however, exceptions to this, for example the campaigns to encourage pedestrians to use the High Street crossings properly, to persuade pedestrians to keep left on pavements and crossings and to persuade more motorcyclists to wear safety helmets.

Drivers

(a) *Signalling*

Observations were made of drivers' behaviour in signalling when turning left, turning right and when stopping or slowing down at a junction. A positive effect was noted in observations made throughout the period of the Experiment at various sites in Slough and for different kinds of vehicles, gains in the proportion of drivers signalling being recorded in ten out of thirteen sets of observations. The general pattern was one of a definite initial improvement which was sustained without further improvement until the end of the Experiment. The results suggest that propaganda and police activity affected mainly the behaviour of local people and that this effect was achieved in the first six months.

(b) *Halting at 'Halt at Major Road Ahead' sign*

Observations were taken of private cars halting at one junction at which a 'Halt' sign existed throughout the Experiment. These observations showed

identical proportions (about 80 per cent) stopping 'dead' in March and August, 1955, and March, 1956. Observations in August, 1956, and March, 1957, showed a reduction of 13 per cent to 19 per cent in the proportion halting, for which there is no obvious explanation.

At another junction police activity was directed to improve the observance of a 'Halt' sign, and observations were subsequently taken (when the police were not at the site) which showed an increase of 8 per cent in the proportion of cars halting in August, 1955, compared with March, 1955. In December, 1955, when this activity ended, the proportion halting was greater by a further 7 per cent. It is evident, therefore, that the police campaign had a good effect.

The 45 per cent of drivers who did not stop dead at this junction in March, 1955, before police activity began, apparently preferred (this being a case where their visibility was not totally obscured) to rely on their own judgment of traffic conditions when emerging. In January, 1956, the 'Halt' sign was replaced by a 'Yield' sign, which requires drivers to use their judgment, but without the obligation to halt, in giving right of way to main road traffic and observations in March, 1956, showed an almost identical proportion not halting (47 per cent) as in March, 1955. Thus with a 'Yield' sign at the junction, drivers behaved in the same way as with the 'Halt' sign before the police campaign.

(c) *Observance of traffic lights*

Observations were taken at the "Three Tuns" crossroads on A.4 to see how far observance of the traffic lights improved following the initial propaganda and police activity. In March, 1955, 6 per cent of vehicles entered the intersection when the red or red/amber signal was showing. In July, 1955, the proportion was reduced to 4 per cent.

The later observations were made before the layout of the junction was improved and the improvement in behaviour must be attributed to the joint effects of propaganda and police activity.

(d) *Parking*

Observations were taken at five periods of the day of the numbers of vehicles parked in the High Street between "The Crown" crossroads and the Uxbridge Road junction (12-17 on key plan). Between March, 1955, and March, 1956, a reduction of about 40 per cent (from an average of 19 to 11) in the number of cars parked in this sector was achieved. The second set of observations closely followed the introduction of additional 'No Waiting' restrictions in the High Street and on adjoining roads in February, 1956. Introduced at the same time were the yellow lines drawing attention to these restrictions (see page 24 of Part I of the Report, also page 52 of Part II) and police action to ensure observance of the restrictions, and these measures thus had a good effect. The average numbers of cars parked in the two official enclosed car parks then available north and south of the High Street increased from 73 in March, 1955, to 106 in August, 1955, 125 in March, 1956, and 149 in August, 1956.

Pedal cyclists

(a) *Signalling*

Observations were taken at one of the roads leading to the Trading Estate from Farnham Road, where police were normally on point duty during the rush

periods, but from which they were withdrawn during the August holiday. Six sets of observations included the time of fuel rationing (when vehicular traffic was reduced) and the holiday period, when the number of cyclists was greatly reduced and there was no one on point duty, as well as normal spring and summer conditions. Improvements in the proportions of cyclists signalling for the right turn (ranging from 5 per cent to 15 per cent) were found under all of these diverse traffic conditions.

Other observations in which the cyclists concerned were principally those making the journey to and from work showed a substantial improvement between March, 1955, and March, 1956, but behaviour deteriorated each summer.

Away from the immediate vicinity of the Trading Estate no improvement was found. Some of the results suggest that differences may have been due to differing conditions during the various observations; for example, a cyclist may be less likely to signal when with other cyclists than when alone. The results, generally, are inconclusive, though it can be said with some confidence that, when conditions were similar, cyclists' behaviour when travelling to and from work improved substantially during the first year of the Experiment.

(b) *Riding two or more abreast*

Observations were taken at a site in the High Street, at another near a major road junction and also on a stretch of road where notices warned 'CYCLISTS SINGLE FILE'. Before the Experiment the proportion of groups of two or more were 10 per cent, 5 per cent and 6 per cent at the three sites respectively. A year later, differences at each of the three sites were negligible, and the overall proportion (7 per cent) was identical with that found in 1955. An improvement (3 per cent) which affected all three sites was found between August, 1955, and August, 1956, but, as in the case of signalling, behaviour in this respect tended to be worse in summer than in the spring.

It should be noted that a proportion of the cyclists riding 'abreast' were either overtaking or forced to ride with some overlap because of the density of the cycle traffic at the time of journeys to and from work.

(c) *Halting at 'Halt at Major Road Ahead' sign*

At a site where a 'Halt' sign was retained throughout the Experiment improvements of 4 per cent to 8 per cent in the proportion of cyclists stopping 'dead' were found in each of five sets of observations taken during the Experiment. These included the period of fuel rationing, when cross-traffic was reduced.

(d) *Carrying objects in hands*

Propaganda warned people of the danger of carrying objects in the hands while cycling, but observations showed no improvement in this respect during the Experiment.

Motor cyclists

Observations of motor cyclists passing along the Bath Road were made at intervals throughout the Experiment to determine the percentage wearing safety helmets and the results are given in Table VIII.

Table VIII

Motorcyclists wearing safety helmets
(excluding pillion passengers)*

Date	Wearing helmets	Number observed
	per cent	
March, 1955	33	410
August, 1955	33	540
February 8th, 1956	55	398
February 28th, 1956	53	453
March, 1956	45	495
August, 1956	44	592
March, 1957	52	429

* Excluding riders of 'scooters' and 'mo-peds'.

There has been a steady rise in the use of helmets in other parts of the country. The general improvement in Slough cannot, therefore, be attributed solely to the Experiment. However, the 20 per cent improvement over both 1955 figures which was found in February, 1956, at the conclusion of the police and propaganda campaign, together with the subsequent fall-off at a time when the tendency in the country was for the use of safety helmets to increase, indicates that the campaign had, at the least, a substantial immediate effect.

These results, which included the times when people were travelling to and from work, will have covered a high proportion of local traffic.

Pedestrians

(a) *Use of 'zebra' crossings*

Studies were made of the use by pedestrians of one of the 'zebra' crossings in the High Street before their replacement by light-controlled crossings.

Observations were taken of all pedestrians crossing the road within a sector which included the zebra crossing and 40 yds either side of it. The proportion of those who began or completed their crossing more than 10 yds from the zebra crossing was reduced from 11 per cent to 4 per cent between March and July, 1955. General police action and road safety propaganda can be said to have had a definite effect in this respect.

(b) *Crossing at light-controlled junctions*

Observations of pedestrians crossing the road at light-controlled crossings were made at two junctions, "The Crown" and "Three Tuns" (12 and 10 on key plan). These showed reductions of the order of 5 per cent in the proportions crossing when the lights showed green to traffic coming from their right in August, 1955, and March, 1956, compared with March, 1955. At both junctions reductions of the same magnitude were found at both times; this suggests that police action and propaganda induced better behaviour and that differing densities of traffic were not responsible for the change observed. It was seen, however, in observations during the period of rationing in March, 1957, that the improvements were not maintained.

(c) *Crossing diagonally at "The Crown" crossroads*

The misuse by pedestrians of the traffic control island at "The Crown" crossroads (12 on key plan) in order to cross the road diagonally was the subject

of an article in the local press shortly after the start of the Experiment and observations three months later showed a reduction of 82 per cent in the number of pedestrians using the island. In November, 1955, crossing in this way was made physically difficult by the erection of the guard rail along the island; observations in March and August, 1956, showed reductions of 50 to 60 per cent on the original number of pedestrians using the island.

(d) *'Keep Left' campaign*

The object of the 'Keep Left' campaign for pedestrians in August and September, 1955, was to reduce the likelihood of their stepping off the pavement with their backs to the traffic and to assist the free flow of pedestrians along the pavement and on crossings. (It was observed that a pedestrian's passage over a crossing is delayed by about one second if he meets a group of six or more pedestrians crossing in the opposite direction.) The campaign produced gains of up to 15 per cent in the proportion of pedestrians walking to the left of the others they met on pavements and crossings, although in no case did the majority of pedestrians do so. On the other hand, there was no gain in the proportion of people who kept to the left-hand half of the pavement. The special measures taken at one crossing, as described on page 15 of Part I, had some initial effect on pedestrians in persuading them to keep to the left on the crossing, but this improvement was not maintained.

(e) *Effects of propaganda on pedestrian behaviour*

It is difficult to assess the extent to which propaganda and police action separately contributed to the improvements observed in pedestrian behaviour and more difficult still to evaluate the effects of such action on accidents. An indication of the value of propaganda by itself is, however, given by the fact that casualties to pedestrians in places where no special police action or engineering works affecting them had been undertaken, i.e. outside the High Street, totalled 162 during the Experiment compared with 175 in the preceding two years, a reduction of 7 per cent, against a corresponding national increase of 5 per cent.

CONTROL OF DOGS

The figures of reported accidents involving dogs for the four years from April, 1953, to the end of the Experiment were 104, 110, 81 and 70 respectively (the majority not resulting in personal injury). The figures suggest that general road safety propaganda and press articles about the danger caused by uncontrolled dogs, and the special poster campaign and police action in August, 1956, had a good effect.

'ROUTES TO SCHOOL' EXPERIMENT

To test the efficacy of the experiment described on pages 7 to 9 of Part I, counts of children were made at several points near the Lea County Junior School (15 on key plan) both before and after new routes for them were suggested. These counts showed that the suggestions had a positive effect in encouraging the use of safer routes and, in particular, that more children were crossing Wexham Road with the assistance of the School Crossing Patrol.

POLICE ENFORCEMENT ACTION

(a) *Intensive campaign (January-March, 1957)*

Of the 634 reports made by the police about traffic offences in this campaign from January to March, 1957, 70 concerned offences at traffic lights, 4 at pedestrian crossings, 75 at 'Halt' or 'Yield' signs, 44 in relation to 'No Waiting' areas, 44 offences as regards the condition of pedal cycle brakes and 397 other traffic offences of various kinds. Nearly one-half of the persons reported were residents of Slough. In 539 cases, court proceedings were taken; in 73 others official warnings were sent out, and in 22 cases no further action was taken. But for the introduction of fuel rationing in December, 1956, which resulted in a considerable reduction in traffic, the number of reports might well have been higher. No fair comparison can be made with the number of reports submitted in a similar period before the Experiment started, but the figure of 634 reports during the campaign is believed to be much larger than would be normal for a comparable period. While improvements were observed in the behaviour of some road users, as described earlier, it is clear from the above that much room is still left for further improvement.

As stated on page 35, there was a relative fall in Slough during the period of this campaign, compared with the country as a whole, in the number of casualties among drivers and their passengers. This fall was greater than that which might have been expected from the reduction in traffic alone, and it is possible that the campaign had an effect on such casualties. The casualties to motorcyclists and pedal cyclists did not, however, show the same effect and the actual figures are too small to provide conclusive results.

(b) *Radar speed-meter checks*

As described on pages 10 and 11, radar speed-meters were used by the police for checking the speed of vehicles and special measurements were made at a point near the end of a restricted section of A.4. Warning notices were erected and the instruments were not used to provide evidence in support of prosecutions.

Measurement of the speed of vehicles before and after passing the police check point were made on a normal day, then on a day when uniformed police were operating with speed-meters and warning notices, and again on the following day when the warning notices, but not the police, were present.

Table IX
Effect of police radar check on speeds

Condition	Vehicles entering 30 m.p.h. section (Westbound)			Vehicles leaving 30 m.p.h. section (Eastbound)		
	Mean Speed (m.p.h.)		Change in mean speed (m.p.h.)	Mean Speed (m.p.h.)		Change in mean speed (m.p.h.)
	Before police check point	After police check point		Before police check point	After police check point	
Normal.	31.3	25.8	- 5.5	26.9	31.5	+ 4.6
Police and notices	31.7	24.9	- 6.8	25.8	28.5	+ 2.7
Notices only	32.0	24.2	- 7.8	27.7	29.7	+ 2.0

Table IX shows that while the police check was in operation there was a reduction of about $1\frac{1}{2}$ m.p.h. in the average speed of vehicles after they had passed the check point, and the display of warning notices on the day following had much the same effect as the police check itself.

Interviews with drivers showed that of those who had heard of these radar speed checks, 57 per cent approved without spontaneously offering any reservations, 10 per cent approved on condition that a warning of their use was given, and 23 per cent were opposed, on the grounds of unfairness or 'un-Britishness'; the remainder expressed no opinion.

VEHICLE TESTING SCHEMES

In all, 1604 cars and 72 light vans were tested at the vehicle testing station in June and July, 1955; of these three-quarters were of post-war manufacture. The following results show that many were in need of attention.

About 30 per cent of pre-war vehicles had stopping distances of over 70 ft at 30 m.p.h., compared with 45 ft for a vehicle with properly adjusted brakes. The corresponding figure for vehicles less than two years old was 4 per cent. About 3 per cent of the front brakes and 10 per cent of the rear brakes of all vehicles were seriously unbalanced. About 20 per cent of the handbrakes would not hold the vehicle on a slope steeper than 1 in 4.

About 40 per cent of all vehicles had at least one poor tyre, usually at the front, and tyres were frequently under-inflated. Nearly one-half of the vehicles were judged to suffer from misaligned front wheels, excessive play or other steering faults.

About 60 per cent of the vehicles had headlamps which were reasonably well aimed vertically, although for only one-quarter was the aim correct; 15 per cent of the vehicles had diffuse or weak headlamp beams. Of all the headlamps 35 per cent were unsatisfactory in one way or another.

About 15 per cent of vehicles had direction indicators which were not working, 18 per cent had stop lights which were not working, and 5 per cent had rear lights which were in poor condition or were not working.

Similar results were found in the tests conducted during 1956. In these tests simpler equipment was used and the scheme showed that useful voluntary vehicle testing arrangements could simply and cheaply be carried out by other Road Safety Committees whose resources would not run to a vehicle testing centre such as that arranged in Slough in 1955.

The numbers of vehicles presented for test show that the publicity about the schemes was successful and revealed a demand for facilities of the kind provided.

Shortly after the vehicle tests were operated surveys were carried out among drivers. Of car drivers interviewed in 1955, 77 per cent had heard about the vehicle testing station and 17 per cent thought of using it or had done so; in 1956 71 per cent had heard about the later scheme. Sources of information were signs and posters (28 per cent and 20 per cent for the two schemes respectively), the local press (22 per cent and 19 per cent respectively) and the national press (13 per cent in both cases). Of goods vehicle drivers 69 per cent and 61 per cent had heard about the two schemes respectively.

Great public interest was shown in the tests, which are believed to have done much to focus public attention on the question of vehicle testing as an aid to road safety. Since that time the Ministry of Transport and Civil Aviation have operated a vehicle testing centre at Hendon, and powers have been conferred by the Road Traffic Act, 1956, to introduce compulsory tests.

STOP LIGHT CAMPAIGN

Observations taken on the roads of Slough in July and November, 1956, a period which spans that of the campaign arranged to encourage the fitting and maintenance of efficient vehicle stop lights, showed a general improvement (see Table X below), and also a particular improvement in the percentage of single stop lights that were working, due mainly to improvements on private cars, light commercial and heavy commercial vehicles. A definite improvement had been observed during observations in 1955 in the percentage of motor cycles having an efficient single stop light; a slight further improvement was observed in 1956.

Table X
Percentage of vehicles with stop lights working—1956

		Light Commercial		Heavy Commercial		Private cars		Motor cycles		Buses		Total	
		July	Nov.	July	Nov.	July	Nov.	July	Nov.	July	Nov.	July	Nov.
Vehicles with two stop lights	Both working	72%	76%	70%	69%	81%	83%	67%	86%	75%	67%	77%	78%
	One working	21%	19%	19%	20%	14%	14%	0%	7%	4%	7%	16%	16%
	No. of vehicles	415	901	267	679	1299	1850	9	15	24	15	2014	3460
Vehicles with one stop light	Working	54%	73%	43%	63%	60%	74%	70%	83%	68%	77%	56%	72%
	No. of vehicles	440	302	314	290	516	394	115	121	133	160	1518	1267

That the number of vehicles with two stop lights increased is probably due to the fact that vehicles were required to have two obligatory rear lights by October, 1956. Doubtless many owners fitted twin stop lights at the same time.

The stoplight campaign, and propaganda about vehicle maintenance generally, may both have contributed to the observed improvements.

STUDIES RELATED TO ENGINEERING AND TRAFFIC SCHEMES

Note: The numbers in the headings relate to points marked on the key plan.

HIGH STREET (A.4) PEDESTRIAN CROSSINGS SYSTEM (12)–(17)

The following information relates to the relative risks of crossing the road at various places along A.4 and is based on pedestrian accidents in 1952 and 1953 and sample counts of the numbers of pedestrians crossing per hour at those places.

<i>Site</i>	<i>Relative Risk</i>
On pedestrian crossings	0.35
Within 50 yards of pedestrian crossings	0.71
Within 20 yards of light-controlled junction	0.22
Elsewhere.	1.00

This evidence that pedestrian crossings and light-controlled crossing places were far safer places for pedestrians to cross the road led to the installation of the light-controlled pedestrian crossings in the High Street.

The success of the crossings depended, of course, on the extent to which pedestrians used them, and to study this pedestrians were counted according to the places where they crossed the High Street. In the course of this study it was found in April, 1956, that 62 000 people crossed the whole length of A.4 in the Borough on a normal week day between 8 a.m. and 6 p.m. About 46 000 people crossed the High Street, i.e. between Burlington Road (280 yds west of "The Crown" crossroads) and Uxbridge Road junction (12-17 on key plan), of whom about 16 500 crossed at "The Crown" crossroads.

Pedestrian flows before and after the installation across the particular lengths now controlled by lights are shown in Table XI.

Table XI

Pedestrian flow across High Street between "The Crown" crossroads and Uxbridge Road junction inclusive

	Number of pedestrians crossing			
	March, 1955 (Zebras)		April, 1956 (Lights)	
	Number per hour	Proportion	Number per hour	Proportion
		per cent		per cent
On crossings	1405	34	2390	52
Within 50 yds of crossings	372	9	209	4
At "The Crown" crossroads	1639	39	1646	36
At Uxbridge Road junction	44	1	32	1
Elsewhere	702	17	332	7
Total	4162	100	4609	100

It will be seen that the number of people using crossings, as distinct from the two light-controlled junctions, increased from 34 per cent to 52 per cent. This increase is of the same order as the increase in the number of crossing places (4 to 6). If the junctions are included, 89 per cent of the people crossed at places where there was positive control of vehicular traffic in April, 1956, compared with 74 per cent at lights and zebra crossings before. In other words, the proportion of people crossing at unprotected places decreased by more than one-half. Unfortunately it appears from later counts taken at various sections along the High Street that this improvement was not fully maintained, particularly in the conditions of decreased traffic resulting from fuel restrictions. In spite of this fall-off, however, increased safety does seem to have been achieved, as shown in Table XII.

Thus, pedestrian casualties in the High Street during the first ten months' use of the signal-controlled crossings fell to 4 from an expected value of about 10. On the crossings there was only one pedestrian casualty, where about 5 would have been expected before the change, while away from the crossings the pedestrian casualties were halved. The one casualty on a crossing occurred when the lights were switched off for repair. Casualties to road users other than pedestrians numbered 15, almost exactly the same number as occurred during the earlier periods; none of these casualties was serious, however, compared

Table XII
Casualties in High Street, Slough
 (excluding "The Crown" crossroads and Uxbridge Road junction)
 10 months, March–December inclusive

Form of crossing	Year	Type	Pedestrian Casualties		Other Casualties		Total
			On crossings	Away from crossings	Caused by crossings	Other causes	
4 Zebra crossings	1953	Slight .	1	2	2	9	14
		Serious .	4	2	—	3	9
		Fatal .	—	—	—	—	—
		Total .	5	4	2	12	23
	1954	Slight .	2	6	1	14	23
		Serious .	1	—	—	3	4
		Fatal .	—	—	—	—	—
		Total .	3	6	1	17	27
	1955	Slight .	4	5	2	10	21
		Serious .	2	1	—	2	5
		Fatal .	—	1	—	—	1
		Total .	6	7	2	12	27
6 Light-controlled crossings	1956	Slight .	1*	1	4	11	17
		Serious .	—	2	—	—	2
		Fatal .	—	—	—	—	—
		Total .	1*	3	4	11	19

* Lights out of order.

with a previous average of 2 serious casualties per ten months' period. Total casualties fell from an average of about 25 to 19, and whereas serious and fatal casualties had previously made up 25 per cent of the total, this proportion fell to 11 per cent.

Interviews with pedestrians immediately after the introduction of the new crossings showed that 85 per cent thought they made crossing the road both easier and safer.

There was no transfer of casualties to the alternative "southern by-pass" route avoiding the High Street (see Appendix 2), although a small proportion of the High Street traffic appears from traffic counts in 1955 and 1956 to have been diverted to it. It seems probable that the diverted traffic was largely composed of local drivers, since the route was not signposted as an alternative. In the period March to December, 1956, there were no casualties on the alternative route; in earlier similar periods in 1953 to 1955 there were on the average 3 casualties on it.

Journey times between the ends of the alternative route (Upton Court Road to "Three Tuns" crossroads (19–10 on key plan)) varied from 6 to 6½ minutes; journey times between the same points along the A.4 varied from 7 to 8½ minutes although the latter journey is about a quarter of a mile shorter. Speeds tended to fall on A.4 until the period of fuel restrictions; this was partly a result of the signals, because speeds on the part between Ditton Road and Langley Road (20–18 on key plan), which was not affected by any roadworks, rose by about 1½ miles per hour between March, 1955, and September, 1956.

To assess the extent to which the lights delayed vehicles, average journey times between Uxbridge Road junction and "The Crown" crossroads (17–12 on key plan) were observed over six periods, each lasting about one week, by running a test vehicle in the traffic. The results are given in Table XIII.

Table XIII

*Journey times and traffic flow in High Street, Slough,
between Uxbridge Road junction and "The Crown" crossroads*

Date		4 Zebra Crossings			6 Pedestrian Signals		
					Setting 1	Setting 2	
						Normal	Fuel rationing period
		Feb./Mar. 1955	May 1955	Oct./Nov. 1955*	Mar./Apr. 1956	Aug. 1956	Jan. 1957
Mean journey time (minutes)	Mean, both directions†	2.40 (34)	2.30 (34)	2.50 (34)	3.15 (200)	3.20 (170)	2.30 (110)
	Eastbound	—	—	—	3.00	2.95	2.25
	Westbound	—	—	—	3.30	3.50	2.35
Mean flow 9 a.m.-6.30 p.m. (Vehicles per hour)	Total	1200‡	1300‡	1190	1170	1220	770
	Eastbound	—	—	620	620	635	410
	Westbound	—	—	570	550	585	360

* Some of the observations in this series were completed in January, 1956.

† Number of return runs on which times are based are shown in brackets.

‡ Estimates based on simple accumulating counter data.

Mean journey times were about 2.4 minutes during 1955. They rose to about 3.2 minutes when the pedestrian signals had just been introduced (Setting 1) and did not change appreciably when the signal settings were altered slightly (Setting 2). Observations in January, 1957, showed that when the mean total flow had fallen to 770 vehicles per hour during fuel rationing (about 60 per cent of its value in August, 1956), the mean journey time had decreased to about 2.3 minutes.

The average speed under normal conditions (9.30 a.m. to 5 p.m.) was about $1\frac{1}{2}$ m.p.h. slower shortly after the introduction of the signals. When traffic fell by about 30 per cent during fuel rationing, there was an increase in speed of about 4 m.p.h. It is of interest to note that westbound journeys were consistently slower than those eastbound, possibly because there are more side turnings and more awkwardly sited bus stops on the south side. Drivers were interviewed and nearly 70 per cent thought the new system made it easier and safer to drive along the High Street, although their opinions on changes in journey time and the number of stops made at crossings were equally divided.

Delays to pedestrians at two light-controlled crossings were compared with those at two zebra crossings which were previously in about the same positions; the waiting time rose from 3.5 seconds to 10 seconds when the signals were first installed and later (with a revised signal setting) to 13 seconds. Some small increase would in any case have been expected since vehicular flow during the observations rose from 950 vehicles per hour when zebras were in use to 1200 vehicles per hour.

The provision of two additional crossings probably shortened journeys for some pedestrians and may have compensated for the extra delay. Certainly many pedestrians were not conscious of increased delay; interviews conducted after the signals had been in operation for one month showed that they were equally divided in their opinions as to whether waiting time had increased or decreased.

However, observations taken in May and July, 1956, at one crossing showed between 22 per cent and 30 per cent of pedestrians starting to cross without waiting for the 'CROSS' signal. Also an increasing tendency was observed at that time for pedestrians to start crossing during the latter part of the 'CROSS' phase, instead of waiting for the next phase.

Apart from additional effort made by the police in instructing pedestrians in the use of the crossings, police time was saved because control at busy times became unnecessary.

In March, 1956, pedestrians were asked which type of pedestrian signal they considered easier to see. Nearly two-thirds of those who had noticed both the roundel and rectangular signals (types A and B on page 15) named the latter and one-quarter the former. (Only about two-thirds of all pedestrians at that time had noticed both types.)

BATH ROAD (A.4) IMPROVEMENT SCHEME (10)-(1)

As described on pages 16, 17 and 19 of Part I, this scheme was designed to deal with traffic emerging from side roads at peak periods and with high speeds on the Bath Road at other times. The results of observations before the introduction of the fixed-time linked traffic lights are given in Table XIV, which shows that mean speeds were generally higher in the evenings when visibility was poorer.

Table XIV

Mean speeds (m.p.h.) on A.4 between the "Three Tuns" crossroads and Huntercombe Lane—October, 1956

Period	Private vehicles	Commercial vehicles		
		Light	Medium	Heavy
Morning and afternoon (9 a.m.—12 noon and 2 p.m.—4.30 p.m.)	31.6	30.1	26.6	24.6
Evening peak (5 p.m.—6.30 p.m.)	28.1	25.0	24.4	21.3
Mid-evening (7.30 p.m.—8.30 p.m.)	32.5	31.0	27.5	22.3

The widening of this road from the "Three Tuns" crossroads to Windsor Lane (10-4 on key plan) from 30 ft to 40 ft to increase its traffic capacity had the temporary effect of increasing speed on the unrestricted section between Leigh Road and Dover Road (8-6 on key plan) by 5 to 7 m.p.h. during the day.

The signals were installed in December, 1956, and the trend in mean speeds along the whole length over the years 1955-1957 is shown in Table XV.

The widening was probably responsible for the increased speed in the late summer of 1956. In 1957, after the signals were in operation, the speed fell to about the day-time average of the signal progression on weekdays (26 m.p.h.).

Spot speed measurements were also made at three sites on the above length between the hours of 7 p.m. and 10.30 p.m.; there was a reduction in average speed of about 4 m.p.h. after the signals had come into operation as compared with evening speeds before widening, and the percentage of vehicles exceeding 30 m.p.h. fell from 70 to 40. At seven sites elsewhere in the Borough average speeds were about the same as in previous years.

Table XV

Mean speeds (m.p.h.) on A.4 between the "Three Tuns" crossroads and Huntercombe Lane—9.30 a.m. to 5 p.m.

1955-1957

1955			1956				1957
Feb./Mar.	May	Oct./Nov.	Mar./Apr.	May	Aug./Sept.	Nov./Dec.	Mar.
30.3	29.9	29.4	31.3	29.8	32.1	31.2	26.5

Fuel shortage and rationing, which coincided with the inauguration of the linked light system on the Bath Road, complicate the study of the effect of the latter on accidents, which would in any case be difficult to assess in the relatively short time since the lights were installed. The number of personal injury accidents on the light-controlled stretch, including the service road, was 13 during the five months January to May, 1957, compared with 22 for the same period averaged over the previous four years. For the whole of Slough the corresponding numbers were 154 and 165. Fatal and serious accidents on the length dropped from an average of 8 to 4, and for the whole of Slough from 46 to 35. Thus the accidents, particularly the more serious ones, have shown a greater fall than in the Borough as a whole.

It is of interest that interviews conducted at the end of the Experiment (in March, 1957), showed that about two-fifths of non-pedestrians felt that there were too many traffic lights in Slough; a slightly larger proportion were satisfied or wanted more traffic lights. Also, while one-quarter criticized the siting of some of the lights, more than two-thirds generally approved.

IMPROVEMENTS AT MAJOR JUNCTIONS ON THE TRUNK ROAD (A.4)

(a) *Junction with Farnham Road (B.473)—"Three Tuns" crossroads (10)*

The altered layout at this junction appears to have brought about a marked improvement in traffic flow, the lane markings provided on the western approach to the junction being particularly effective in segregating traffic into its proper lanes, thus minimizing the tendency for through traffic to be obstructed by other traffic turning right into Farnham Road. The central island is undoubtedly useful in guiding right-turning traffic in each direction, though there was some initial confusion among local drivers as to their proper line through the junction. This difficulty was overcome by the provision of temporary white arrows on the roadway and, once drivers had become familiar with the new layout, the difficulty disappeared.

For two years before the Experiment, personal injury accidents were occurring at this junction at the rate of approximately 10 per year. After the

alteration, which was completed in August, 1955, the rate was reduced to approximately 7 per year.

(b) *Junction with Montem Lane (B.3027) (11)*

The altered layout in this case also appears to give improved traffic flow and to be effective in lessening the obstruction to west to east traffic on the main road caused by vehicles waiting to take the right turn. Here, too, it was necessary to provide arrows to indicate to traffic the proper line through the junction.

The improvement was not completed until January, 1957, however, and it is too early, therefore, to say whether it has had any effect on accident figures.

(c) *Junction with Windsor Road and William Street (A.332)—"The Crown" crossroads (12)*

Following the erection in November, 1955, of a guard-rail on the central island of "The Crown" crossroads, the number of personal injury accidents at the point fell from a rate of about $6\frac{1}{2}$ per year beforehand to a rate of about 5 per year after the improvement. Only one pedestrian was injured at this site in sixteen months following the improvement, compared with 8 in thirty-one months beforehand (see also pages 41 and 42).

(d) *Junction with Ditton Road (A.331) and Langley High Street (B.470)—"William IV" crossroads (20)*

The installation of traffic signals at this junction was not completed until August, 1956, and it is therefore too early to draw any firm conclusions from the accident figures. There has, however, been a reduction in personal injury accidents to a total of 2 since the completion of the installation, compared with 3 in a similar period beforehand.

(e) *Junction with Old Bath Road (B.3378) and Sutton Lane—"The Colnbrook roundabout" (21)*

The Colnbrook roundabout improvement was not able to be completed until July, 1957, and no accident data are, therefore, yet available.

OTHER JUNCTION IMPROVEMENTS

As the accidents at sites where minor junction improvements were made were generally few in number, these have all been combined. The number of personal injury accidents occurring at 11 such sites during the period of the Experiment (excluding two junctions in the High Street, which may have been affected by the new traffic lights) was 39, compared with 44 in the corresponding two-year period before. This change is not statistically significant, even when compared with the overall increase in accidents which occurred in the town as a whole, but it should, of course, be noted that the changes occurred at various times during the Experiment and almost certainly the comparison will prove to underestimate their effect.

BUS BAYS

Public transport is satisfactorily using the new bus bays and this has resulted in a smoother flow of traffic and has removed the obstruction to other drivers' visibility which existed when buses had to stop in the stream of traffic to allow passengers to board and alight. No assessment can yet be made as to the effect on accidents.

It is considered that the yellow line used to denote the extent of areas subject to 'No Waiting' restrictions, and the double yellow line used to indicate areas where waiting for loading or unloading purposes is prohibited at specified times, have been of great assistance to drivers, and also to the police in reducing the effort needed to secure compliance with the restrictions. While signs to the standard type and number were used in addition in Slough, it is considered that in any application of the yellow line system on a national basis, some of the intermediate signs at present required could probably be dispensed with. The lines cannot, of course, indicate the full nature of the restrictions and must always, therefore, be additional to and not in substitution for the standard 'No Waiting' signs.

Wear and tear on the lines has not been as great as might be expected, except at road junctions where large numbers of pedestrians step on the line, and it appears probable that, even in heavy traffic, a well-laid plastic line can be expected to last approximately two years.

Interviews with road users, other than pedestrians, in March and September, 1956, showed respectively that 61 per cent and 67 per cent thought that the yellow line was a better means than signs of deterring them from parking. 6 per cent and 9 per cent respectively favoured signs; 21 per cent and 13 per cent respectively thought there was nothing to choose between them. In the two sets of enquiries 14 per cent and 9 per cent respectively gave an incorrect explanation of the purpose of the lines, and a further 21 per cent in both cases said they did not know their purpose; that the latter figures are so high is possibly due in large part to the fact that many of those interviewed were strangers to the area.

While no statistical results are available to indicate any effect which the lane markings on A.4, and the wider markings at sharp bends and other hazards, may have had on accidents, a greater tendency of traffic to keep within proper bounds has been noticed, which inevitably would tend to reduce accident potential.

USE OF REFLECTOR POSTS—WESTLANDS BENDS (2)

The speed of traffic round the Westlands Bends was no doubt considerably reduced by the effect of the progressive traffic signal system which extends over this stretch of road, and it is therefore difficult to separate the effect of this system from the effect of the reflectorized discs which were used to delineate the bends as described on page 25.

In the ten months after the installation of the reflectorized discs, however, there were only two slight casualties on the bends compared with an average of 2 serious and 4 slight casualties in the corresponding periods for the previous three years.

STREET LIGHTING

It has been found elsewhere that good-quality lighting in place of poor, or no, lighting, can reduce accident frequency at night by about one-third. There was, in fact, a reduction in the number of accidents which occurred by night on the length of the Trunk Road on which improved lighting was installed in 1955-56, which was consistent with these earlier results, and it is estimated that it represents a saving of about 3 personal injury accidents during the second year of the Experiment.

The period since the installation of the trial lighting on the Colnbrook By-pass (22 on key plan) is too short to allow any effect on accidents to be observed. First impressions are, however, that the seeing conditions at night are improved.

'SCHOOL' SIGN

Drivers using the road at the site of the new 'school' sign (15 on key plan) referred to on page 9, were interviewed before and after it was erected. The original 'school' sign, with the traditional torch, was picked out more than twice as often as any other among those illustrated in the Highway Code as the sign which drivers tended to miss; its purpose 'failed to register' three or four times as often as that of any other sign, in two 'before and after' enquiries. The 'school' sign was one of the last two signs which drivers passed before the site of the interview; the proportion of drivers who recalled passing it were:

While old sign in use: 18 per cent

New sign, not illuminated: 34 per cent

New sign, illuminated: 37 per cent.

The new sign was thus recalled substantially more often. 40 per cent of the drivers interviewed were local residents and 60 per cent passed the school at least twice weekly, and familiarity with the sign may account for the slightness of the effect of neon illumination at the times of assembly and dispersal.

However, motorists' reactions do not appear to justify the extra expense which was involved in illuminating the sign.

'YIELD RIGHT OF WAY' SIGNS

Personal injury accidents involving vehicles leaving the side roads at junctions controlled by 'Yield' signs (marked 'Y' on key plan) numbered 6 in the period of thirteen months from their erection to the end of the Experiment. This was slightly less, in relation to accidents in the whole Borough, than before the sign: were erected, but no conclusion is possible at this stage. Further signs were erected outside the Borough as a part of a wider experiment conducted by the Ministry of Transport and Civil Aviation, whose findings are not yet available.

Observations in Slough have suggested that the sign reduces exit delays in the absence of main road traffic, but does not affect behaviour in the presence of the latter. As described on page 39, a 'Halt' sign at one junction where visibility was relatively good, had only, in the absence of special police action, the same effect on the behaviour of drivers as the 'Yield' sign that later replaced it, and to the extent that the 'Yield' sign, if used generally, would legitimize behaviour involving no essential risk, its adoption could well be an advantage. Road user opinion about the sign was at first predominantly favourable, but by September, 1956, some opposition was expressed on the basis that drivers would not understand the meaning of the sign. About 50 per cent of all classes of road user favoured a less ambiguous sign, but in fact only a small minority of people interviewed did not themselves understand the sign, despite its novelty and the fact that it was in use only at a limited number of places. About 40 per cent preferred 'Yield' signs to 'Halt' and 'Slow' signs because they thought they gave a clearer or more explicit or more sensible instruction, or on the ground that the old signs were over-familiar or often ignored. The larger size and better visibility of the 'Yield' sign was favourably commented upon.

GENERAL

It has not been possible to make separate assessments of the effects of all the engineering schemes on accidents or at this stage to reach definite conclusions on them. When the visibility at a junction is improved, or a road is widened, behaviour which originally carried an element of danger may no longer do so. Some of the behaviour studies show that after road works had been carried out road users passing a site became less cautious over such matters as signalling, overtaking, etc. These studies have not been considered relevant to the present discussions.

However, it is encouraging to note that in each of the eight separate changes about which accident information has been given above (including the group of junction improvements) the number of personal injury accidents has changed in a favourable direction.

STUDIES RELATED TO PUBLIC OPINION SURVEYS

OPINION ABOUT THE FAULTS OF ROAD USERS

It may be of interest to record some views which were expressed by members of the public about the faults of road users.

(a) *Pedestrians*

In the first four inquiries made in 1955-1956, pedestrians named most frequently the following faults as those to which Slough pedestrians as a class were prone:

- Not looking before crossing: 26 per cent to 39 per cent
- Not using existing crossings: 20 per cent to 34 per cent
- Getting off moving buses: 17 per cent to 21 per cent.

By the end of the Experiment the third most frequently named fault was 'crossing against the lights'.

3 per cent to 6 per cent of pedestrians did not think that pedestrians behaved dangerously in Slough.

The introduction of the light-controlled pedestrian crossings in the High Street was followed by an increase of over 10 per cent in the number of pedestrians naming the non-use of crossings as a fault of pedestrians, and this increase was maintained until the end of the Experiment. The proportion saying that pedestrians behaved dangerously by crossing against the lights increased progressively by 4-5 per cent in each successive inquiry after their installation.

Pedestrians named motor cyclists most frequently (30 per cent to 35 per cent) as the group causing most danger to others.

(b) *Drivers*

Car and commercial vehicle drivers were asked separately in what ways they considered drivers of *their own class* behaved dangerously on Slough roads. The following are the faults most frequently named:

	<i>Car drivers</i>	<i>Commercial vehicle drivers</i>
Overtaking near junctions	22-33 per cent	13-18 per cent
Speeding	21-27 per cent	10-26 per cent
Failure to signal for turn	14-26 per cent	7-17 per cent

8 per cent to 13 per cent of motorists, and 30 per cent to 35 per cent of commercial vehicle drivers did not think that their own group behaved dangerously in Slough.

After the installation of the Bath Road Traffic lights the proportion of car drivers who named overtaking fell substantially, and the proportion of commercial vehicle drivers who named speeding fell to less than half its previous level.

Otherwise, apart from seasonal trends, the figures varied little during the Experiment and there is no indication of any increased awareness of any particular fault as a result of publicity. Parking faults were named less frequently by car drivers in 1956 than in 1955, corresponding with an observed improvement in parking in the High Street.

Car and commercial vehicle drivers (about 16 per cent and 14 per cent respectively) named motor cyclists less frequently than did pedestrians as the group causing most danger to others and were both more concerned about pedal cyclists (between 32 per cent and 43 per cent); between 42 per cent and 53 per cent also thought that pedal cyclists were the group running the greatest risk to themselves from others.

(c) General

The 'courtesy cop' technique was suggested by 13 per cent to 22 per cent of non-pedestrians in the first three inquiries as a means of reducing the risk from the group considered the most dangerous. In the fourth enquiry in September, 1956, following police activity along these lines, the percentage naming this means fell to 8 per cent, but it rose again after the enforcement campaign in 1957.

In none of the five inquiries was police enforcement, in the sense of increasing the number of prosecutions, suggested by more than 4 per cent, either of pedestrians or other road users, as a means of reducing the danger from whatever group they considered to be the most dangerous.

OPINION AS TO MEANS OF MAKING ROADS SAFER

In enquiries as to the measures which they thought would improve safety, 34 per cent of road users other than pedestrians originally thought that the building of the Slough-Maidenhead By-pass or other new roads would be one of the best safety measures for Slough; by the end of the Experiment, when many apparently successful minor road improvement schemes had been introduced, only 23 per cent thought in terms of major works as the best solution. The proportion suggesting road widening fell from an original figure of 15 per cent to 9 per cent. Similar, but less marked trends were found among pedestrians.

At first the proportion of road users, other than pedestrians, who suggested controls on parking as an aid to safety was 7 per cent; after measures of this kind had been extended this figure fell to 2 per cent. Other frequent suggestions by non-pedestrians were:

One-way streets and diversions: 4 per cent to 10 per cent

Cycle tracks: 4 per cent to 5 per cent

'Courtesy cops': 3 per cent to 7 per cent

Limiting speeds: 3 per cent to 6 per cent

Education: 1 per cent to 5 per cent

Creation of new offences: 1 per cent to 4 per cent.

5 per cent to 7 per cent of non-pedestrians thought that compulsory single file riding for cyclists should be tried. Cycle tracks were suggested by about 13 per cent of pedestrians and 20 per cent of all other road users, as a protection for what they considered to be the most vulnerable group; the numbers making this suggestion were approximately the same among each of the four non-pedestrian groups, including cyclists. These figures varied little during the Experiment and indicate a measure which, although not tried in Slough, was widely felt to be desirable; they also show how, in a town with abnormally many cyclists, other road users thought road safety measures for them important.

OPINION ABOUT DANGER SPOTS IN SLOUGH

Also of interest are the following results of interviews as regards the places in Slough which in people's opinion were the most dangerous. The commonest sites mentioned were:

	<i>Key plan reference</i>
"Dolphin" (Uxbridge Road) Bridge	16
"The Crown" crossroads	12
High Street, west of "The Crown" crossroads up to "Three Tuns" crossroads	12-10
High Street in general	12-17
Junction of Uxbridge Road and Wexham Road with A.4	17
Farnham Road and turnings off it	7-10
"Three Tuns" crossroads	10
Bath Road alongside Trading Estate	4-8
Everitts Corner	3

These road users were asked to name the two most dangerous places in Slough, but an average of about 20 per cent could think of no outstanding danger spot and a further 30 per cent could name only one. There was no marked consensus of opinion and many other sites were mentioned. About half of all positive replies, however, named one or other of the first five sites listed above.

With the exception of the first site (which is to be the subject of a major improvement unconnected with the Experiment) most of the sites are lengths of road or intersections where minor or major improvements have been carried out as part of the Experiment and, in spite of any degree of physical improvement that could be carried out, it is considered that they are likely to remain potential danger spots.

THE FEELING OF SAFETY

Before the Experiment, and at regular intervals thereafter, road users were asked whether, from a general standpoint, they thought the roads of Slough were more dangerous, about the same, or less dangerous than those of other towns of the same size. As the Experiment progressed, more and more among each group of road users said that Slough was safer than other towns. In particular, before the Experiment, only 9 per cent of pedestrians said that Slough was safer; after one year the proportion had increased to 25 per cent and after two years to 48 per cent.

On a more personal plane they were asked whether they themselves found the roads in Slough safer, about the same, or less safe than before the Experiment.

After six months 38 per cent of pedestrians and 30 per cent of other road users said they felt safer; by this date few engineering or traffic schemes had been introduced. A year later these proportions had increased to 59 per cent and 48 per cent respectively.

The above findings do not, of themselves, indicate that Slough was in fact made safer, since it is possible that road users said they felt safer simply because they knew that measures were being introduced with the object of making them so.

However, it seems probable that the opinions expressed were considered ones, based on each road user's personal experience in crossing the roads of Slough and driving along them. If the findings mean that drivers found other drivers more willing to give way and generally to behave more safely, and pedestrians less likely to 'jay-walk', and if pedestrians felt that better facilities were provided for them to cross the road in safety, then these results may be taken as evidence of a general opinion, if not a scientific conclusion, that the Experiment had had good results.

Asked in March, 1956, what scheme they thought most likely to make Slough's roads safer, 57 per cent of pedestrians named the High Street light-controlled crossings; this was immediately after their introduction. The corresponding percentage for other road users was 44 per cent, and generally this scheme remained overwhelmingly at the top of the list.

At all periods only a very small percentage of people named any measure forming a part of the Experiment which in their opinion would do no good.

PART III

Discussion of Results

The results of the Experiment as a whole

The Management Group are unanimous in considering that, despite certain difficulties and limitations as described in Part II of this Report, the results of the Slough Experiment are important. Many of the results give positive evidence of success, thus encouraging the belief that road safety can be increased by a variety of existing and new methods. At the same time it must be emphasized that at this stage full and final conclusions are not possible, and indeed a considerable period must elapse before they can be reached; there is every reason at present to expect that later conclusions will provide further encouragement.

The object in Slough was a concentration, on a moderate scale, of a wide variety of measures designed to reduce accidents. It is, of course, far from being the case that anything like an 'all out' attack was made, and there are many possible measures which could not be included, and which are therefore outside the scope of this Report.

Past experience suggests, having regard to road conditions and the economic situation as they exist and the nature and causes of accidents, that any major impact on the national problem of road accidents within a reasonably short time can only be made by bringing about improvements in the conduct and habits of road users, whether by education or new regulatory measures. The indications from the Experiment are that improvements can be achieved by educational measures, and also that the police, from their position of special authority, are able very greatly to increase the impact; on the other hand, the process must inevitably be a continuing one. The conclusion, however, is also drawn that the physical improvement of road conditions from the aspect of safety and the extension of traffic controls give good results. Such measures will often, though by no means invariably, be relatively expensive in first cost, but maintenance costs will usually be small in comparison. While the Experiment afforded practically no opportunity to try out new measures to regulate the conduct of road users, it has pointed the way to certain steps which might be taken in this field.

In considering the results of the Experiment in terms of its overall effect on casualties and accidents, it should be noted that it was undertaken in progressive stages and, in particular, the effects of the engineering schemes could only begin to be felt in the second year. It is important, moreover, to bear in mind the effects of increased population and traffic, and also the fact that the Experiment was conducted not in a vacuum but in a limited area which is close to London and is traversed daily by a great deal of through and long-distance traffic. Taking these factors into account, the marked difference between the experience in Slough and in the country as a whole in the trend of fatal and serious casualties over the period of the Experiment, compared with the two years previously, is felt to be a notable result. These casualties were reduced from 263 to 238, whereas, had they followed the national trend, they would have been increased to about 290. In monetary terms this reduction of nearly 20 per cent represents

an economic gain approaching £20 000 per year and this figure does not take into account the benefit of reduced human suffering.

The fact that the number of accidents involving slight injury which came to the notice of the police was almost 20 per cent higher during the period of the Experiment than in the previous two years, and indeed showed a greater increase than for the country as a whole, is, of course, disappointing. This disproportionate increase was, however, to some extent reduced as the Experiment progressed, and the results referred to on page 35 for the first three months after the end of the experimental period have been distinctly more favourable. It is felt that there may be considerable justification for the view expressed in this connection that since the Experiment started there has been an increase in the completeness of reporting of slight casualties in Slough. Although individually slight casualties are generally of relatively minor importance, their occurrence at the present rate in Great Britain of about 200 000 annually adds up to a serious economic loss, as does the effect of material damage in these and other accidents.

While, therefore, the reduction in serious casualties recorded up to the present time may be considered a by no means unsatisfactory outcome of the work which has been done, the Management Group suggest that it will be prudent to suspend final judgment on the results of the Experiment as a whole until future trends can be seen. The engineering and traffic measures taken in the Experiment may be expected to show continued good results, and it is hoped that the educational measures will also do so; the Slough Borough Council are maintaining a substantial part of the propaganda and educational effort which was made during the Experiment, in the hope that its effects will be maintained and indeed increased.

It is felt that the Experiment has been of particular value in enabling new ideas to be tried out, and in ascertaining the reactions of the public to them. Many of these individual measures, in the fields of education, police activity and engineering, show considerable promise. Another important result has been to demonstrate the great value of bringing to bear a fully co-operative effort; this applies not only as regards the authorities who were represented in the management of the Experiment but over a much wider field.

Education—Propaganda and training

As is explained in Part II of the Report, it has proved impossible to assess directly the effects on accident frequency of the propaganda and educational measures which were undertaken. However, the engineering works, owing to the relatively late stage at which they were introduced, were unlikely to have contributed much to the favourable results achieved in the first twelve months, and the educational and police efforts, therefore, were mainly responsible. On the other hand, during the second twelve months the effects of engineering measures were added. It seems likely that the educational campaign produced results which were satisfactory in relation to its cost, but it must again be stressed that it was considerably strengthened by police participation. We deal with the police aspect later.

Another point which should be emphasized is that the extent of measures which involved direct training of individuals was relatively small in relation to the resident population, and such measures should not, in our view, be regarded as having made more than a marginal contribution to the result. We emphasize this because in our view such measures, if developed on a really large scale,

could not fail to have important results, though they would necessarily involve a great deal of effort and expense. The Experiment, therefore, while providing an opportunity to demonstrate the practicability of expanding the schemes for training child cyclists and novice motor cyclists, and for improving standards of driving, in no way provided a test of their value.

Much the same considerations apply to the general education of children in road safety; the Experiment has provided the opportunity to intensify this work in Slough and much progress has been made. Though the results up to the present are not impressive, we hope that an improvement will reveal itself in due course. The number of casualties to both child pedestrians and child cyclists must be viewed in the light of the large increase in the school population during the Experiment, but slight casualties to child cyclists increased rather alarmingly. We feel that probably efforts directed towards both children and parents must be made even more intensive. The response during the Experiment to the increased facilities provided for training and testing child cyclists was encouraging, but even so the numbers trained are relatively small. We would wholeheartedly endorse the view of the Departmental Committee on Road Safety in their 1956 Report that all children who take up cycling should receive such training and pass a proficiency test, and we are glad to hear of the intention in the near future to launch a national scheme. We would also commend the 'Routes to school' experiment for extended trial; it necessarily involved a good deal of effort by teachers, the Road Safety Council and the Road Research Laboratory, but we feel that it represents a realistic method of approach. We regret that it was not possible to initiate an experiment with 'scholar patrols', which are an established feature in the United States.

Reverting to the general effects of the two-year educational campaign, as described in Part II, the Management Group wish to stress that although the direct effect of these measures on the accident rate could not be assessed, distinct improvements in certain classes of behaviour were observed. Thus, signalling prior to turning or stopping at a junction was seen to be more frequent among drivers and cyclists, and observance of the correct procedure at traffic lights likewise improved. We feel it can be taken for granted that this kind of improvement must make for greater safety. It should also be noted that the changes generally occurred early in the Experiment and were maintained without subsequent improvement, such as might have been hoped for as a result of the continuing activity. This is at least consistent with the possibility that it was the behaviour of local people which was mainly affected and that it was the propaganda and police activities in the early stages which were particularly important. At the same time, it is probably true that behaviour would have deteriorated subsequently if the propaganda and educational measures had not continued.

It should be stressed particularly that the local press formed a very useful publicity medium. Of particular value was the weekly press conference, at which news was given out about campaigns, engineering schemes, road safety rallies, competitions and training schemes, and information on the numbers of accidents and generally on the progress of the Experiment. The local papers passed on advice concerning good road user behaviour and did another useful service in explaining to the public the technical reasons for the various road schemes.

Non-resident drivers, who were found on Slough roads to outnumber resident drivers, said that roadside publicity played a most important part in informing them of the Experiment. The special notices erected at the Borough

boundaries and elsewhere to call the attention of visiting road users to the Experiment were, of course, features which are appropriate only to a campaign being carried out in a limited area, and it is hardly necessary for us to point out that by no means all of the publicity measures adopted in the Experiment would necessarily be the best, or indeed appropriate at all, in a campaign covering a wider area or the whole country. We feel that detailed recommendations in relation to a national campaign are outside the scope of this Report, but we would like to express the hope that the detailed measures described in Part I will be considered by both national and other local authorities for use as appropriate. The features to which we would draw particular attention are, firstly, the importance of securing the co-operation of the public by keeping them fully informed at each stage of the objectives and methods adopted; secondly, the importance of full police co-operation; and, thirdly, the effects of individual campaigns concentrated on specific objectives: some of these latter, though of relatively short duration, achieved good results, but others, particularly the attempts to induce pedestrians to keep to the left on pavements and crossings, were inconclusive and need further experiments under more favourable conditions.

As regards attempts to secure improvement of standards of driving and vehicle maintenance we would draw attention to the interest which was aroused by the safety rallies, refresher courses and vehicle tests. The publicity given to them had good results and often attracted considerable voluntary help, and the Management Group strongly recommend that schemes of this kind should be greatly developed.

We are glad to report an increase in the use of safety helmets by motor cyclists, but even so only 50 per cent of all riders yet appear to use them regularly. The problem of casualties to motor cyclists is almost certainly made much more serious by the fact that few riders receive expert tuition. The excellent R.A.C./A.C.U. Learner Motor Cyclist Scheme, which is operating very well in Slough owing to the enthusiastic efforts of the Farnham Royal Motor Cycle Club and its members, can cater only for a small proportion of those who take up motor cycling.

Finally, we would refer again to the question of vehicle maintenance. As regards motor vehicles, evidence of generally poor standards was shown up by the voluntary tests conducted in Slough. The Road Traffic Act, 1956, now makes provision for compulsory testing to be introduced, but we feel that this is unlikely to be the complete answer to the problem and that there will be a continuing need for propaganda directed to the improvement of maintenance, and also for facilities to be provided for vehicles to be tested voluntarily at regular intervals. The facilities for voluntary testing which were tried out during the Experiment produced an excellent response, and this seems to have been the experience where similar facilities have subsequently been provided elsewhere. We consider that the Ministry should now encourage local road safety committees to organize such facilities from time to time as part of their normal activities. In our view such voluntary tests should be as comprehensive as possible and should cover all features of vehicles and their equipment which have a bearing on safety, though where facilities are limited tests concentrated on the more important items, as arranged in Slough in the summer of 1956, would still prove effective. The co-operation of the motor trade is most valuable in arranging tests and our experience suggests that it will readily be given.

As regards maintenance of pedal cycles, the three months' campaign under-

taken by the police in 1956 showed that poor maintenance is all too frequent and that standards can be improved by giving this matter proper attention.

The problem of the extent to which road accidents can be reduced by better maintenance both of motor vehicles and of pedal cycles is one about which insufficient information is available at the present time. Unfortunately the Experiment could provide no direct evidence bearing on it. We suggest, however, that the evidence of poor standards of maintenance which has been disclosed provides a strong *prima facie* case for developing propaganda and police efforts to secure improvements and for making detailed studies of individual accidents in order to determine the extent to which defective maintenance actually contributes to them.

Police activity, including enforcement

The Buckinghamshire Police have played a major role in the Experiment. The beneficial result on road safety of intensified police activity, particularly of an educational nature, is already well established and the problem is mainly one of providing the additional manpower and resources which are needed. In the Slough Experiment the additional manpower which could be made available by temporary diversion from other duties inside and outside the Borough was strictly limited and it was felt that for the greater part of the period the main effort of the police should be concentrated in support of the general educational and propaganda effort and deployed in a manner likely to give most advantages from the point of view of enhancing its effects. It is considered that this policy in no small measure contributed to the result which was achieved.

It must, therefore, be recorded that the Experiment afforded no opportunity to test out the effects of a really major increase in police efforts, but the favourable results of increasing activity were observed in a number of contexts, as described in Part II. During the final three months of the Experiment the police switched, as an experiment, to a campaign of strict enforcement in order to observe its effects, and, as has been noted, there are indications that this produced a positive result, though it appears to have led also to some deterioration in the good relations between the police and the public.

The use of the radar speed-meter during the Experiment was mainly in order to gain experience of its operation, and it was not relied on to provide evidence for prosecutions. It was observed, however, that the notices warning motorists of its use had a marked effect in reducing speeds.

Generally speaking, members of the public in Slough co-operated well with the police during the Experiment. This was particularly noticeable at the outset when it was known that the main aim of the police was to inspire goodwill and courtesy among all classes of road user. There was, however, less co-operation in the drive to persuade pedestrians to walk on the left of the pavement and to get motor cyclists to wear safety helmets, and this may be because the police were endeavouring to enforce a line of conduct which was not prescribed by legislation.

No new regulations or statutory measures were imposed during the Experiment apart from some extension of 'No Waiting' restrictions and the imposition of the new form of restrictions on loading and unloading in the immediate vicinity of 'The Crown' crossroads and Uxbridge Road junction as described on page 16. These measures are considered to have been successful. It was hoped to observe the effects of the experimental 40 m.p.h. and 20 m.p.h. speed limits, but this is not yet possible.

Following the introduction of the linked pedestrian traffic lights in the High Street, the police and the Management Group consider that a favourable opportunity is presented of introducing experimental restrictions on crossing the street elsewhere than at the crossings and requiring pedestrians to cross in accordance with the lights, as envisaged by section 46 of the Road Traffic Act, 1956. Certain proposals have now been made in this regard to the Ministry by the Slough Borough Council.

The number of accidents caused by dogs has caused the police in Slough particular concern in recent years and, as noted in Part II, these have now fallen considerably. Both the police and the Management Group, however, feel that Slough presents a case for the use of the new powers conferred by section 15 of the Road Traffic Act, 1956, to make orders requiring dogs to be kept on a lead, and the matter has been under consideration between the Slough Borough Council and the Ministry.

Engineering and traffic schemes

As already noted, the engineering and traffic schemes which were decided on as part of the Experiment have been designed primarily with the object of reducing the number of accidents on particular stretches of road or at particular places which have been revealed as 'accident black-spots'. Records before the Experiment showed that nearly half of the personal injury accidents in the Borough occurred on the 6½-mile length of the Trunk Road A.4, and the engineering measures have been very largely concentrated on this road. At the same time, it should not be thought that the works undertaken represent anything approaching a radical engineering treatment of this length of road from the point of view of accident prevention. Available funds were strictly limited, and the purpose of the engineering aspect of the Experiment was primarily to assess the results of the expenditure of a given sum of money on particular schemes which were likely to have useful results both in reducing accidents and in providing guidance for the treatment of similar problems elsewhere.

Since the engineering schemes which were undertaken could, for the most part, be brought into operation only during the second year of the Experiment, and in some cases at a very late stage, it is still too early to attempt a final assessment of their value, and only preliminary judgments can be made.

Both the major schemes undertaken were of a novel character, namely, the provision of the linked pedestrian-operated traffic lights in the High Street and the improvement of the 2-mile stretch of the Bath Road in the western part of the Borough with the installation of linked traffic lights at eleven junctions. It should be pointed out that the linking of successive traffic signals to operate on a predetermined pattern may present difficult technical and practical problems, and can only be adopted where the conditions are suitable. The installation in the High Street, which provides for breaks in the traffic to enable pedestrians to cross, was only possible because there were no serious problems arising from intersections and turning traffic along this stretch of the Trunk Road. The Bath Road installation to the west was designed with a quite different purpose in mind, namely, of reducing the speed of traffic along a section of road where accidents of a serious nature have been frequent and at the same time providing positive control of vehicular traffic to and from the industrial Trading Estate to the north of the road.

There is little doubt that the High Street scheme, which has been operating successfully since February, 1956, has increased the safety conditions for

pedestrians. Propaganda and police action must take a good deal of credit for this in making the crossings widely used. The controlled crossings have caused slight delays in crossing the street, but this effect was not generally noticed. The travelling time of vehicular traffic was slightly increased, but police time devoted to supervision has been saved. A general feeling of greater security appears to have been engendered in both the motorist and the pedestrian public. The rectangular pedestrian signals used were preferred to the standard roundel type, but they are, of course, more expensive. As already noted, we consider that conditions here are favourable for an experiment in requiring pedestrians to use the crossings and to cross only in accordance with the signals and hope that it will be possible to proceed with this.

The system of linked traffic lights on the Bath Road, which was completed in December, 1956, has not been installed long enough to give conclusive results as regards accidents, but the reduction so far obtained in both serious and slight accidents gives good grounds for anticipating its continuation. The system is also considered to have been effective in reducing excessive speeds without undue inconvenience to the majority of traffic and has improved the conditions of access to and from the Trading Estate. The imposition of speed control, when first announced, gave rise to a good deal of criticism, which we consider not to have been unreasonable, since the scheme involves the reduction of through speeds to not more than 30 m.p.h. on a 2-mile stretch of road of which $\frac{2}{3}$ mile is not subject to the 30 m.p.h. limit, and the fixed-time operation of the lights means that traffic may be held up at intersections where there is no traffic crossing. Nevertheless, quite apart from the accident experience, the system appears to be working well enough for us to express the hope that it will be given an extended trial.

Generally, the various junction improvements and other engineering works which were undertaken appear, as noted in Part II, to have brought about an improvement in traffic conditions and reductions in accidents.

We would point particularly to the success of the yellow lines—single and double—as a supplementary means of indicating restrictions on waiting and on loading and unloading, and thus securing their better observance, which should undoubtedly increase safety. They are of considerable assistance to the public and to the police and we suggest that they should be given a trial on a considerably more extensive scale.

The new 'Yield' signs appear to be satisfactory as an alternative to 'Halt' and 'Slow' signs at suitable junctions, but final conclusions must await the findings from the experiment by the Ministry over a wider area, including Slough.

Conclusions and recommendations

The Management Group venture finally in the following paragraphs to summarize the main conclusions and suggestions which they feel justified in putting forward at the present stage.

The Experiment as a whole

(1) The Slough Experiment has been a most worthwhile venture, and taking all relevant factors into account should be considered to have achieved its purpose of pointing to methods whereby road accidents can be reduced by measures which are economically practicable. It is, however, too soon to attempt to assess fully the results of what has been attempted, and studies should be continued as necessary over the next two or three years.

(2) The Experiment has served to demonstrate the value of bringing a combination of both educational and engineering measures to bear on the accident problem. In education, both propaganda and training have an important part to play, and a significant role can be played by the police. Indeed, the part of the police in accident prevention is of the utmost importance, and they may be able to achieve at least as much by educational measures as by concentrating primarily on the enforcement of traffic laws and regulations. On the other hand, the improvement of road conditions by engineering and traffic schemes, as is well known, produces definite results, and such work should be carried out as financial conditions permit; engineering schemes generally, though not always, involve relatively heavier initial expenditure but they do not require continuing publicity efforts to maintain their results.

(3) If a measurable impact is to be made on the problem of road accidents in Great Britain in the present conditions of increasing traffic, considerably greater resources must be made available for this work. These considerations apply both to the educational and engineering aspects, as well as to police activities.

Education—Propaganda and training

(4) The Experiment has not, on the basis of present indications, succeeded in proving more than the general case for the efficacy of educational methods of attacking this problem. In the conditions under which the Experiment was carried out no other result is felt to have been possible. It is obviously of great importance, however, that more study should be devoted to this matter with a view to gaining more knowledge in separate experiments of the individual educational measures which achieve the best results for the minimum expenditure of resources. A localized Experiment as conducted in Slough will not, of course, necessarily give guidance on the best national approach to the problem.

(5) Educational measures which have been tried in the Experiment have included both the continuation of a fairly intensive general concentration over a full two-year period and successful and unsuccessful concentration on particular objectives over much shorter periods. It may well still be too early for the full results of the effort as a whole to be seen, and only further observations of what happens in Slough in the next year or two can give guidance on this. In these circumstances, the Management Group feel that the right course is to seek to maintain the efforts as far as possible rather than to allow it forthwith to run down, as in their opinion this will give a fairer trial than could be achieved in only a two-year effort of the results to be gained by the intensification of road safety education and propaganda. They are glad to learn that the Slough Borough Council feel that in any case many of the measures initiated in Slough during the Experiment must be continued, and that the Council will have the support of the Minister in the continuation of their efforts.

(6) The individual features of bad or negligent road behaviour on the part of all classes of road users, often leading to accidents, are so numerous that it is not proposed to attempt to list them. The Experiment has given strong indications that concentration on specific lessons is more immediately profitable than generalized pleas for greater care. A new feature, however, is the evidence which has been obtained of poor maintenance by their owners both of motor

vehicles and of pedal cycles, and while the actual extent of the contribution which defective maintenance of vehicles makes to the accident problem as a whole is still very largely a matter of surmise it is felt that the case is already proved for attempting to improve matters by local voluntary vehicle testing schemes and by propaganda. Generally, it is hoped that study of the measures taken in Slough in the field of education and propaganda will give useful guidance both to the Ministry and to the Royal Society for the Prevention of Accidents in planning national campaigns and to local authorities who may be disposed to adopt some of them in their own areas.

(7) So far as road safety measures for children are concerned, the Management Group feel that probably much more needed to have been done among both children and parents than has been attempted, as the results concerning child accidents are disappointing, whereas on the basis of past experience greater success might have been expected. While they are confident that the efforts in Slough will be intensified as a result of the Experiment, they suggest that an intensive new 'Slough Experiment' devoted entirely to measures for the greater safety of children and their training to become safe road users throughout their lives might be undertaken in some suitable locality.

(8) In the field of practical training and measures designed to improve individual skills, experience during the two years has shown that there is likely to be a ready response to the provision of increased facilities. In many respects the problem of effective basic training for child cyclists, motor cyclists and drivers is the fundamental issue in the whole problem of road safety, and the scope for development is enormous; 'refresher' training may be equally important. Some progress was made during the Experiment and we would call special attention to the useful additional experiment which was undertaken with the help of Raleigh Industries Ltd. in the training of child cyclists, and the reduction from 12 weeks to 9 weeks which was effected in the standard period of training under the R.A.C./A.C.U. training scheme for learner motor cyclists without reducing the amount of instruction.

Police activities

(9) The general result in Slough has been to demonstrate the very great importance of the part which can be played by the police in influencing the conduct of road users and in undertaking and supporting educational measures.

Engineering and traffic schemes

(10) There is already a great deal of knowledge of the individual effects on accident rates of different types of engineering and traffic control measures and we hope that studies in Slough will in due course provide useful new information after the measures have been in operation for a reasonable time. The results of installing the High Street system of light-controlled pedestrian crossings appear to be very promising, and will no doubt continue to be carefully observed. The Bath Road scheme is a new conception but it seems to be achieving its object. It should be noted that both these schemes have involved to some extent a slowing down of the average speed of through traffic; this is undesirable in principle and represents economic loss, but in certain conditions, as in the case of these two schemes, the interests of greater safety and traffic flow may well be in mutual conflict, and the opposing effects must be carefully weighed.

(11) It should be appreciated that the carrying out of engineering measures on the Trunk Road (A.4) was in no sense intended to constitute an alternative scheme to the construction of the projected Slough By-pass. On the other hand, the construction of a by-pass for a town like Slough should not be thought to provide an automatic solution for its road safety problem.

(12) As regards the experimental measures which were undertaken, we would especially commend the efficacy of the yellow lines on the carriageway which were used to mark areas subject to restrictions on waiting or on loading and unloading and the rectangular signals used to give information to pedestrians in the High Street installation. The proposals for experimental 40 m.p.h. and 20 m.p.h. speed limits have still to be put into effect and improved direction signs still remain to be erected.

Final conclusions

(13) Finally, the Management Group wish to record the fact that they have found in every quarter very great enthusiasm for the objects of the Experiment and for tackling the problems involved, and that they have received the greatest possible support from all the authorities concerned and from very many organizations and individuals. The personal interest shown by the Minister of Transport and Civil Aviation and the Joint Parliamentary Secretary responsible for inland transport matters has been particularly valuable and stimulating, while co-operation between central and local authorities has been both harmonious and wholly fruitful. It is also considered that the response of the people of Slough was excellent, and well justified the attempt which was made to keep the public fully informed. The Experiment was therefore carried out in a very favourable atmosphere, though it may be hoped that similarly favourable conditions would be found to exist wherever similar efforts might be made elsewhere. The success of the Experiment has also been furthered by the opportunity which was allowed to try out novel and experimental measures of different kinds, and by the interest, and sometimes controversy, which these measures aroused.

(14) The concentration of many different measures within a limited area and period of time, although they were phased as far as possible, has made it difficult in many cases to assess their individual effects, and, while further studies will add to the information, it may well be necessary in some instances to make further trials of particular measures in isolation before final judgments can be formed. We do not, therefore, suggest, at any rate for research purposes, that the Slough Experiment should be carried out in the same form in other towns. The need may be rather for further attempts to assess against each other the effects of individual measures and methods tried in isolation. However, we do not for this reason wish to be thought critical of the nature of the task which we were asked to undertake—rather the reverse, for an attempt to try out and demonstrate to the public the effects of a concentrated attack on the problems of road accidents was in our view badly needed. We should also qualify our remarks by pointing out that the problems arising in country districts and methods of attacking them may well prove very different from those of Slough, and we think it would be useful to embark on a similar Experiment in a suitable County area.

(15) The Management Group consider that perhaps the most important lessons of all are, firstly, that the problem of road accidents does not admit of

any single or straightforward approach but demands a co-ordinated attack from all possible aspects. The effort in Slough was far from being comprehensive and, for example, excluded any measures of the type which would involve new or amending legislation. Secondly, the problem demands continuous joint efforts by all the interested authorities and organizations, as well as by public-spirited private bodies and individuals. There are probably very few elements in the community who could not, if they were so minded, contribute a great deal to the solution of the problem. In Slough many of them have done so, and interest and co-operation in tackling the problem has been very greatly developed during the Experiment; the Management Group and the Slough Road Safety Council feel confident that this trend can be further increased. Providing leadership is given and sufficient resources are available, there exists in this context no problem of apathy or indifference.

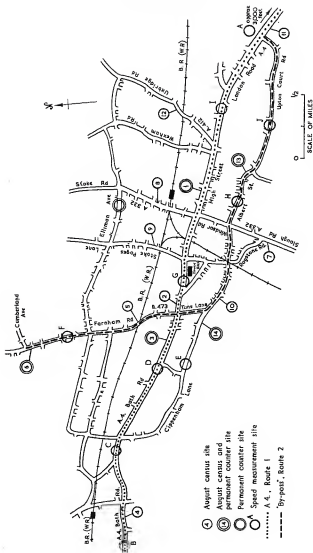
APPENDIX 1

DIARY OF MAIN EVENTS DURING THE EXPERIMENT

<i>Date</i>	<i>Education and Propaganda</i>	<i>Police Activities</i>	<i>Introduction of Engineering and Traffic Schemes</i>
1955			
March	<i>Social Survey interviews and observations.</i>		
April	Experiment began (2nd April).		
	Beginning of continuous two-year campaign.	Co-operation throughout Experiment with educational measures. Start of special campaign lasting one month.	
	Distribution of first brochure and Highway Code.		
May	Accident beacon erected.		
June	Operation of vehicle testing station.		
July		Special campaign lasting from July to December.	
August	'Keep Left' campaign, continuing in September.		Completion of "Three Tuns" improvement.
September	<i>Social Survey interviews and observations.</i>		
October		Safety helmet campaign, continuing until February.	Yellow lines in 'No Waiting' areas.
November			Guard rail at "Crown" crossroads.
December		End of six-month police campaign.	
1956			
January			Completion of Group A lighting on A.4.
February			Inauguration of High Street pedestrian signals. Introduction of 'Yield' signs.
March	<i>Social Survey interviews and observations.</i>		
April	School of cycling. 'Routes to school' experiment started.		New 'School' signs.
June	Second brochure distributed. Vehicle Testing Scheme on three Sundays in June and July.	Pedal cycle campaign, continuing for 3 months.	Westlands Bends improvement completed.

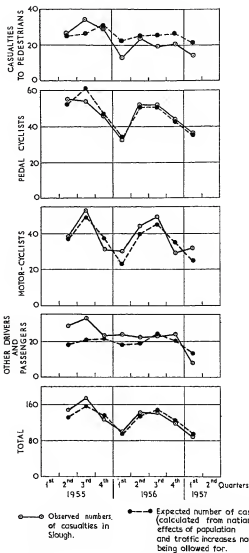
<i>Date</i>	<i>Education and Propaganda</i>	<i>Police Activities</i>	<i>Introduction of Engineering and Traffic Schemes</i>
1956			
July			Bus bays completed.
August	Dogs campaign.	Dogs campaign.	"William IV" crossroads-installation of traffic lights.
September	National 'Mind that Child' campaign lasting till end of November.	Social Survey interviews and observations.	
October	Stop light campaign lasting 3 months.	Special campaign lasting 1 month.	
November			Colnbrook By-pass experimental lighting installed.
December	(Beginning of fuel rationing—17th December.)		Bath Road improvements and traffic lights in operation.
1957			
January		Special enforcement campaign lasting 3 months.	Montem Lane junction improvement completed.
March	Social Survey interviews and observations. End of Experimental period—31st March.		
May	(End of fuel rationing—14th May.)		
June	Distribution of final brochure.		
July			Completion of Colnbrook roundabout improvement.

APPENDIX 2



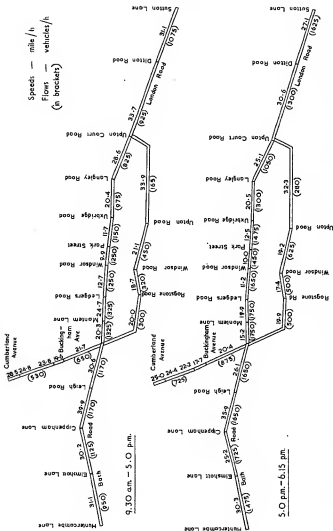
Appendix 2—Census sites, routes of test car and speed measurement sites in Slough

APPENDIX 3



Trends in casualties to four classes of road-user during Slough Experiment

APPENDIX 4



Appendix 4—Average traffic flows (Feb. 1955—Sept. 1956) and journey speeds (Aug.—Sept. 1956) of test car on routes 1 and 2 in Slough (see Appendix 2) during the day and evening peaks

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Posters with "Safety Town" symbol

SOMEONE HAS BEEN KILLED

ON THE ROAD IN SLOUGH WHEN THE RED LIGHT
IS SHOWING IN THE CENTRE OF THIS JUNCTION
THE GREEN LIGHT DENOTES THAT, ALTHOUGH
THERE MAY HAVE BEEN AN ACCIDENT IT
WAS NOT FATAL

MAKE SLOUGH THE SAFETY TOWN



Accident beacon at "The Crown" crossroads (inset shows notices on guard rails)



Refresher course for drivers

PLATE 3



School of cycling—April, 1956

PLATE 4



Illuminated "School" sign
PLATE 5



Vehicle testing station—June, 1955

PLATE 6



Radar speed check

PLATE 7



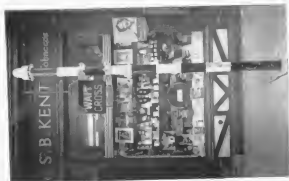
High Street—light-controlled pedestrian crossing

PLATE 8



High Street—pedestrian push-button and acknowledgement panels

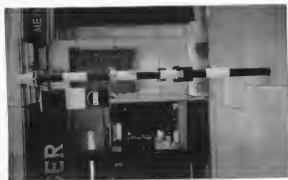
PLATE 9



Type C



Type B
High Street—pedestrian signals
PLATE 10



Type A



Bath Road—progressive traffic signal control

PLATE 11



Bath Road—refuge for traffic turning right

PLATE 12



Carriageway markings—Colnbrook roundabout

PLATE 13



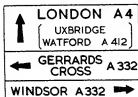
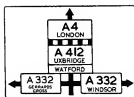
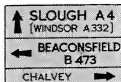
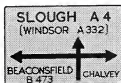
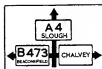
Colnbrook By-pass—experimental lighting (view from car using dipped headlights)

PLATE 14



"Yield" sign

PLATE 15



Existing signs

Proposed new signs

Examples of existing and proposed advance direction signs
(Shading indicates yellow background)

NEW PLAN OF THE UNIVERSITY CAMPUS SHOWING THE LAYOUT OF THE BUILDINGS AND THE EXPERIMENT REPORT

KEY

1. Buildings (shaded) 2. Roads 3. Green spaces 4. Water bodies 5. Other features

SCALE

0 100 200 300 400 500 600 700 800 900 1000

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